

# ArcSin

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## Notations

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### Traditional name

Inverse sine

### Traditional notation

$\sin^{-1}(z)$

### Mathematica StandardForm notation

ArcSin[z]

## Primary definition

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01.12.02.0001.01

$$\sin^{-1}(z) = -i \log\left(iz + \sqrt{1-z^2}\right)$$

The function  $\sin^{-1}(z)$  can also be defined as the inverse function for  $\sin(w)$ :

$w = \sin^{-1}(z)$  if and only if  $\sin(w) = z$ .

## Specific values

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### Values at fixed points

01.12.03.0001.01

$$\sin^{-1}(0) = 0$$

01.12.03.0002.01

$$\sin^{-1}\left(\frac{\sqrt{3}-1}{2\sqrt{2}}\right) = \frac{\pi}{12}$$

01.12.03.0003.01

$$\sin^{-1}\left(-\frac{\sqrt{3}-1}{2\sqrt{2}}\right) = -\frac{\pi}{12}$$

01.12.03.0004.01

$$\sin^{-1}\left(\frac{\sqrt{5}-1}{4}\right) = \frac{\pi}{10}$$

01.12.03.0005.01

$$\sin^{-1}\left(-\frac{\sqrt{5}-1}{4}\right) = -\frac{\pi}{10}$$

01.12.03.0006.01

$$\sin^{-1}\left(\frac{\sqrt{2-\sqrt{2}}}{2}\right) = \frac{\pi}{8}$$

01.12.03.0007.01

$$\sin^{-1}\left(-\frac{\sqrt{2-\sqrt{2}}}{2}\right) = -\frac{\pi}{8}$$

01.12.03.0008.01

$$\sin^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{6}$$

01.12.03.0009.01

$$\sin^{-1}\left(-\frac{1}{2}\right) = -\frac{\pi}{6}$$

01.12.03.0010.01

$$\sin^{-1}\left(\frac{1}{2}\sqrt{\frac{5-\sqrt{5}}{2}}\right) = \frac{\pi}{5}$$

01.12.03.0011.01

$$\sin^{-1}\left(-\frac{1}{2}\sqrt{\frac{5-\sqrt{5}}{2}}\right) = -\frac{\pi}{5}$$

01.12.03.0012.01

$$\sin^{-1}\left(\frac{\sqrt{2}}{2}\right) = \frac{\pi}{4}$$

01.12.03.0013.01

$$\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right) = -\frac{\pi}{4}$$

01.12.03.0014.01

$$\sin^{-1}\left(\frac{\sqrt{5}+1}{4}\right) = \frac{3\pi}{10}$$

01.12.03.0015.01

$$\sin^{-1}\left(-\frac{\sqrt{5}+1}{4}\right) = -\frac{3\pi}{10}$$

01.12.03.0016.01

$$\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = \frac{\pi}{3}$$

01.12.03.0017.01

$$\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) = -\frac{\pi}{3}$$

01.12.03.0018.01

$$\sin^{-1}\left(\frac{\sqrt{2+\sqrt{2}}}{2}\right) = \frac{3\pi}{8}$$

01.12.03.0019.01

$$\sin^{-1}\left(-\frac{\sqrt{2+\sqrt{2}}}{2}\right) = -\frac{3\pi}{8}$$

01.12.03.0020.01

$$\sin^{-1}\left(\frac{1}{2}\sqrt{\frac{5+\sqrt{5}}{2}}\right) = \frac{2\pi}{5}$$

01.12.03.0021.01

$$\sin^{-1}\left(-\frac{1}{2}\sqrt{\frac{5+\sqrt{5}}{2}}\right) = -\frac{2\pi}{5}$$

01.12.03.0022.01

$$\sin^{-1}\left(\frac{1+\sqrt{3}}{2\sqrt{2}}\right) = \frac{5\pi}{12}$$

01.12.03.0023.01

$$\sin^{-1}\left(-\frac{1+\sqrt{3}}{2\sqrt{2}}\right) = -\frac{5\pi}{12}$$

01.12.03.0024.01

$$\sin^{-1}(1) = \frac{\pi}{2}$$

01.12.03.0025.01

$$\sin^{-1}(-1) = -\frac{\pi}{2}$$

01.12.03.0026.01

$$\sin^{-1}(i) = i \log(\sqrt{2} + 1)$$

01.12.03.0027.01

$$\sin^{-1}(-i) = i \log(\sqrt{2} - 1)$$

### Values at infinities

01.12.03.0028.01

$$\sin^{-1}(\infty) = -i\infty$$

01.12.03.0029.01

$$\sin^{-1}(-\infty) = i\infty$$

01.12.03.0030.01

$$\sin^{-1}(i\infty) = i\infty$$

01.12.03.0031.01

$$\sin^{-1}(-i\infty) = -i\infty$$

01.12.03.0032.01

$$\sin^{-1}(\infty) = \infty$$

## General characteristics

### Domain and analyticity

$\sin^{-1}(z)$  is an analytical function of  $z$ , which is defined over the whole complex  $z$ -plane.

01.12.04.0001.01

$$z \rightarrow \sin^{-1}(z) :: \mathbb{C} \rightarrow \mathbb{C}$$

### Symmetries and periodicities

#### Parity

$\sin^{-1}(z)$  is an odd function.

01.12.04.0002.01

$$\sin^{-1}(-z) = -\sin^{-1}(z)$$

#### Mirror symmetry

01.12.04.0003.01

$$\sin^{-1}(\bar{z}) = \overline{\sin^{-1}(z)} ; z \notin (-\infty, -1) \wedge z \notin (1, \infty)$$

#### Periodicity

No periodicity

### Poles and essential singularities

The function  $\sin^{-1}(z)$  does not have poles and essential singularities.

01.12.04.0004.01

$$\text{Sing}_z(\sin^{-1}(z)) = \{\}$$

### Branch points

The function  $\sin^{-1}(z)$  has three branch points:  $z = \pm 1$ ,  $z = \infty$ .

01.12.04.0005.01

$$\mathcal{BP}_z(\sin^{-1}(z)) = \{1, -1, \infty\}$$



01.12.04.0006.01

$$\mathcal{R}_z(\sin^{-1}(z), 1) = 2$$

01.12.04.0007.01

$$\mathcal{R}_z(\sin^{-1}(z), -1) = 2$$

01.12.04.0008.01

$$\mathcal{R}_z(\sin^{-1}(z), \infty) = \log$$

## Branch cuts

The function  $\sin^{-1}(z)$  is a single-valued function on the  $z$ -plane cut along the intervals  $(-\infty, -1]$  and  $[1, \infty)$ .

The function  $\sin^{-1}(z)$  is continuous from above on the interval  $(-\infty, -1]$  and from below on the interval  $[1, \infty)$ .

01.12.04.0009.01

$$\mathcal{BC}_z(\sin^{-1}(z)) = \{(-\infty, -1], -i\}, \{[1, \infty), i\}$$

01.12.04.0010.01

$$\lim_{\epsilon \rightarrow +0} \sin^{-1}(x + i\epsilon) = \sin^{-1}(x) /; x < -1$$

01.12.04.0011.01

$$\lim_{\epsilon \rightarrow +0} \sin^{-1}(x - i\epsilon) = -\sin^{-1}(x) - \pi /; x < -1$$

01.12.04.0012.01

$$\lim_{\epsilon \rightarrow +0} \sin^{-1}(x - i\epsilon) = \sin^{-1}(x) /; x > 1$$

01.12.04.0013.01

$$\lim_{\epsilon \rightarrow +0} \sin^{-1}(x + i\epsilon) = \pi - \sin^{-1}(x) /; x > 1$$

## Analytic continuations

The analytic continuation of  $\sin^{-1}$  has infinitely many sheets; the values of  $\tilde{\sin}^{-1}$  are  $\tilde{\sin}^{-1}(z) = \sin^{-1}(z) + 2k\pi /; k \in \mathbb{Z}$ .

## Series representations

### Generalized power series

Expansions at generic point  $z = z_0$

### For the function itself

01.12.06.0023.01

$$\sin^{-1}(z) \propto \frac{\pi}{2} + \left(\frac{1}{1-z_0}\right)^{\frac{1}{2}} \left[\frac{\arg(z_0-z)}{2\pi}\right] (1-z_0)^{\frac{1}{2}} \left[\frac{\arg(z_0-z)}{2\pi}\right] \left(2\pi i i^{\left[\frac{\arg(z-z_0)}{2\pi}\right]} \left[\frac{\arg(z-z_0)}{2\pi}\right] \left[\frac{\arg(z_0+1)+\pi}{2\pi}\right] - \left(\frac{1}{z_0+1}\right)^{\frac{1}{2}} \left[\frac{\arg(z-z_0)}{2\pi}\right] (z_0+1)^{\frac{1}{2}} \left[\frac{\arg(z-z_0)}{2\pi}\right] \left(\cos^{-1}(z_0) - \frac{z-z_0}{\sqrt{1-z_0^2}} - \frac{z_0(z-z_0)^2}{2(1-z_0^2)^{3/2}} + \dots\right) \right) /; (z \rightarrow z_0)$$

01.12.06.0024.01

$$\sin^{-1}(z) \propto \frac{\pi}{2} + \left(\frac{1}{1-z_0}\right)^{\frac{1}{2}} \left[\frac{\arg(z_0-z)}{2\pi}\right] (1-z_0)^{\frac{1}{2}} \left[\frac{\arg(z_0-z)}{2\pi}\right] \left(2\pi i i^{\left[\frac{\arg(z-z_0)}{2\pi}\right]} \left[\frac{\arg(z-z_0)}{2\pi}\right] \left[\frac{\arg(z_0+1)+\pi}{2\pi}\right] - \left(\frac{1}{z_0+1}\right)^{\frac{1}{2}} \left[\frac{\arg(z-z_0)}{2\pi}\right] (z_0+1)^{\frac{1}{2}} \left[\frac{\arg(z-z_0)}{2\pi}\right] \left(\cos^{-1}(z_0) - \frac{z-z_0}{\sqrt{1-z_0^2}} - \frac{z_0(z-z_0)^2}{2(1-z_0^2)^{3/2}} + O((z-z_0)^3)\right) \right)$$

01.12.06.0025.01

$$\sin^{-1}(z) = \frac{\pi}{2} + \left(\frac{1}{1-z_0}\right)^{\frac{1}{2}} \left[\frac{\arg(z_0-z)}{2\pi}\right] (1-z_0)^{\frac{1}{2}} \left[\frac{\arg(z_0-z)}{2\pi}\right] \left(2\pi i i^{\left[\frac{\arg(z-z_0)}{2\pi}\right]} \left[\frac{\arg(z-z_0)}{2\pi}\right] \left[\frac{\arg(z_0+1)+\pi}{2\pi}\right] + \left(\frac{1}{z_0+1}\right)^{\frac{1}{2}} \left[\frac{\arg(z-z_0)}{2\pi}\right] (z_0+1)^{\frac{1}{2}} \left[\frac{\arg(z-z_0)}{2\pi}\right] \left(\frac{\sqrt{\pi}}{2} \sum_{k=0}^{\infty} \sum_{j=0}^k \frac{\left(-\frac{1}{2}\right)_{k-j}}{(k-j)! j!} {}_2\tilde{F}_1\left(1, 1; \frac{3}{2} - j; \frac{1}{2}(z_0+1)\right) (z-z_0)^k - \pi\right) \right)$$

01.12.06.0026.01

$$\sin^{-1}(z) = \frac{\pi}{2} + \left(\frac{1}{1-z_0}\right)^{\frac{1}{2}} \left[\frac{\arg(z_0-z)}{2\pi}\right] (1-z_0)^{\frac{1}{2}} \left[\frac{\arg(z_0-z)}{2\pi}\right] \left(2\pi i i^{\left[\frac{\arg(z-z_0)}{2\pi}\right]} \left[\frac{\arg(z-z_0)}{2\pi}\right] \left[\frac{\arg(z_0+1)+\pi}{2\pi}\right] - \left(\frac{1}{z_0+1}\right)^{\frac{1}{2}} \left[\frac{\arg(z-z_0)}{2\pi}\right] (z_0+1)^{\frac{1}{2}} \left[\frac{\arg(z-z_0)}{2\pi}\right] \left(\frac{\pi}{2} - \frac{\sqrt{\pi}}{2} \sum_{k=0}^{\infty} \frac{2^k z_0^{1-k}}{k!} {}_3\tilde{F}_2\left(\frac{1}{2}, \frac{1}{2}, 1; 1 - \frac{k}{2}, \frac{3-k}{2}; z_0^2\right) (z-z_0)^k\right) \right)$$

01.12.06.0027.01

$$\sin^{-1}(z) \propto \frac{\pi}{2} + \left(\frac{1}{1-z_0}\right)^{\frac{1}{2}} \left[\frac{\arg(z_0-z)}{2\pi}\right] (1-z_0)^{\frac{1}{2}} \left[\frac{\arg(z_0-z)}{2\pi}\right] \left(2\pi i i^{\left[\frac{\arg(z-z_0)}{2\pi}\right]} \left[\frac{\arg(z-z_0)}{2\pi}\right] \left[\frac{\arg(z_0+1)+\pi}{2\pi}\right] - \left(\frac{1}{z_0+1}\right)^{\frac{1}{2}} \left[\frac{\arg(z-z_0)}{2\pi}\right] (z_0+1)^{\frac{1}{2}} \left[\frac{\arg(z-z_0)}{2\pi}\right] \cos^{-1}(z_0) \right) (1 + O(z-z_0))$$

**Expansions on branch cuts**

## For the function itself

### In the left half-plane

01.12.06.0028.01

$$\sin^{-1}(z) \propto \frac{\pi}{2} + 2\pi i i \left\lfloor \frac{\arg(z-x)}{2\pi} \right\rfloor \left[ \frac{\arg(z-x)}{2\pi} \right] - e^{\pi i \left\lfloor \frac{\arg(z-x)}{2\pi} \right\rfloor} \left( \cos^{-1}(x) - \frac{z-x}{\sqrt{1-x^2}} - \frac{x(z-x)^2}{2(1-x^2)^{3/2}} + \dots \right) /; (z \rightarrow x) \wedge x \in \mathbb{R} \wedge x < -1$$

01.12.06.0029.01

$$\sin^{-1}(z) \propto \frac{\pi}{2} + 2\pi i i \left\lfloor \frac{\arg(z-x)}{2\pi} \right\rfloor \left[ \frac{\arg(z-x)}{2\pi} \right] - e^{\pi i \left\lfloor \frac{\arg(z-x)}{2\pi} \right\rfloor} \left( \cos^{-1}(x) - \frac{z-x}{\sqrt{1-x^2}} - \frac{x(z-x)^2}{2(1-x^2)^{3/2}} + O((z-x)^3) \right) /; x \in \mathbb{R} \wedge x < -1$$

01.12.06.0030.01

$$\sin^{-1}(z) = \frac{\pi}{2} + 2\pi i i \left\lfloor \frac{\arg(z-x)}{2\pi} \right\rfloor \left[ \frac{\arg(z-x)}{2\pi} \right] + e^{\pi i \left\lfloor \frac{\arg(z-x)}{2\pi} \right\rfloor} \left( \frac{\sqrt{\pi}}{2} \sum_{k=0}^{\infty} \sum_{j=0}^k \frac{\left(-\frac{1}{2}\right)_{k-j}}{(k-j)! j!} (1-x)^{j-k+\frac{1}{2}} (x+1)^{\frac{1}{2}-j} {}_2\tilde{F}_1\left(1, 1; \frac{3}{2}-j; \frac{x+1}{2}\right) (z-x)^k - \pi \right) /; x \in \mathbb{R} \wedge x < -1$$

01.12.06.0031.01

$$\sin^{-1}(z) = \frac{\pi}{2} + 2\pi i i \left\lfloor \frac{\arg(z-x)}{2\pi} \right\rfloor \left[ \frac{\arg(z-x)}{2\pi} \right] - e^{\pi i \left\lfloor \frac{\arg(z-x)}{2\pi} \right\rfloor} \left( \frac{\pi}{2} - \frac{1}{2} \sqrt{\pi} \sum_{k=0}^{\infty} \frac{2^k x^{1-k}}{k!} {}_3\tilde{F}_2\left(\frac{1}{2}, \frac{1}{2}, 1; 1 - \frac{k}{2}, \frac{3-k}{2}; x^2\right) (z-x)^k \right) /; x \in \mathbb{R} \wedge x < -1$$

01.12.06.0032.01

$$\sin^{-1}(z) \propto \frac{\pi}{2} + 2\pi i i \left\lfloor \frac{\arg(z-x)}{2\pi} \right\rfloor \left[ \frac{\arg(z-x)}{2\pi} \right] - e^{\pi i \left\lfloor \frac{\arg(z-x)}{2\pi} \right\rfloor} \cos^{-1}(x) (1 + O(z-x)) /; x \in \mathbb{R} \wedge x < -1$$

### In the right half-plane

01.12.06.0033.01

$$\sin^{-1}(z) \propto e^{\pi i \left\lfloor \frac{\arg(x-z)}{2\pi} \right\rfloor} \left( -\cos^{-1}(x) + \frac{z-x}{\sqrt{1-x^2}} + \frac{x(z-x)^2}{2(1-x^2)^{3/2}} + \dots \right) + \frac{\pi}{2} /; (z \rightarrow x) \wedge x \in \mathbb{R} \wedge x > 1$$

01.12.06.0034.01

$$\sin^{-1}(z) \propto e^{\pi i \left\lfloor \frac{\arg(x-z)}{2\pi} \right\rfloor} \left( -\cos^{-1}(x) + \frac{z-x}{\sqrt{1-x^2}} + \frac{x(z-x)^2}{2(1-x^2)^{3/2}} + O((z-x)^3) \right) + \frac{\pi}{2} /; x \in \mathbb{R} \wedge x > 1$$

01.12.06.0035.01

$$\sin^{-1}(z) = e^{\pi i \left\lfloor \frac{\arg(x-z)}{2\pi} \right\rfloor} \left( \frac{1}{2} \sqrt{\pi} \sum_{k=0}^{\infty} \sum_{j=0}^k \frac{\left(-\frac{1}{2}\right)_{k-j}}{(k-j)! j!} (1-x)^{j-k+\frac{1}{2}} (x+1)^{\frac{1}{2}-j} {}_2\tilde{F}_1\left(1, 1; \frac{3}{2}-j; \frac{x+1}{2}\right) (z-x)^k - \pi \right) + \frac{\pi}{2} /; x \in \mathbb{R} \wedge x > 1$$

01.12.06.0036.01

$$\sin^{-1}(z) = e^{\pi i \left\lfloor \frac{\arg(x-z)}{2\pi} \right\rfloor} \left( \frac{1}{2} \sqrt{\pi} \sum_{k=0}^{\infty} \frac{2^k x^{1-k}}{k!} {}_3\tilde{F}_2 \left( \frac{1}{2}, \frac{1}{2}, 1; 1 - \frac{k}{2}, \frac{3-k}{2}; x^2 \right) (z-x)^k - \frac{\pi}{2} \right) + \frac{\pi}{2} /; x \in \mathbb{R} \wedge x > 1$$

01.12.06.0037.01

$$\sin^{-1}(z) \propto \frac{\pi}{2} - e^{\pi i \left\lfloor \frac{\arg(x-z)}{2\pi} \right\rfloor} \cos^{-1}(x) (1 + O(z-x)) /; x \in \mathbb{R} \wedge x > 1$$

**Expansions at  $z = 0$**

**For the function itself**

01.12.06.0001.02

$$\sin^{-1}(z) \propto z + \frac{z^3}{6} + \frac{3z^5}{40} + \dots /; (z \rightarrow 0)$$

01.12.06.0038.01

$$\sin^{-1}(z) \propto z + \frac{z^3}{6} + \frac{3z^5}{40} + O(z^7)$$

01.12.06.0002.01

$$\sin^{-1}(z) = \sum_{k=0}^{\infty} \frac{\left(\frac{1}{2}\right)_k z^{2k+1}}{(2k+1)k!} /; |z| < 1$$

01.12.06.0003.01

$$\sin^{-1}(z) = z {}_2F_1 \left( \frac{1}{2}, \frac{1}{2}; \frac{3}{2}; z^2 \right)$$

01.12.06.0004.02

$$\sin^{-1}(z) \propto z + O(z^3)$$

01.12.06.0039.01

$$\sin^{-1}(z) = F_{\infty}(z) /; \left( F_n(z) = \sum_{k=0}^n \frac{\left(\frac{1}{2}\right)_k z^{2k+1}}{(2k+1)k!} = \sin^{-1}(z) - \frac{z^{2n+3}}{2\sqrt{\pi}} \Gamma \left( n + \frac{3}{2} \right)^2 {}_3\tilde{F}_2 \left( 1, n + \frac{3}{2}, n + \frac{3}{2}; n + 2, n + \frac{5}{2}; z^2 \right) \right) \wedge n \in \mathbb{N}$$

Summed form of the truncated series expansion.

**For small integer powers of the function**

**For the second power**

01.12.06.0005.02

$$\sin^{-1}(z)^2 \propto z^2 + \frac{z^4}{3} + \frac{8z^6}{45} + \dots /; (z \rightarrow 0)$$

01.12.06.0040.01

$$\sin^{-1}(z)^2 \propto z^2 + \frac{z^4}{3} + \frac{8z^6}{45} + O(z^8)$$

01.12.06.0006.01

$$\sin^{-1}(z)^2 = \sum_{k=0}^{\infty} \frac{2^{2k} k!^2 z^{2k+2}}{(2k+1)!(k+1)} ; |z| < 1$$

01.12.06.0007.01

$$\sin^{-1}(z)^2 = z^2 {}_3F_2\left(1, 1, 1; \frac{3}{2}, 2; z^2\right)$$

01.12.06.0008.02

$$\sin^{-1}(z)^2 \propto z^2 + O(z^4)$$

01.12.06.0041.01

$$\sin^{-1}(z)^2 = F_{\infty}(z) ;$$

$$\left( F_n(z) = \sum_{k=0}^n \frac{2^{2k} k!^2 z^{2k+2}}{(2k+1)!(k+1)} = \sin^{-1}(z)^2 - \frac{1}{2} \sqrt{\pi} z^{2n+4} \Gamma(n+2)^2 {}_3\tilde{F}_2\left(1, n+2, n+2; n+\frac{5}{2}, n+3; z^2\right) \right) \bigwedge n \in \mathbb{N}$$

Summed form of the truncated series expansion.

### Expansions at $z = 1$

### For the function itself

01.12.06.0009.02

$$\sin^{-1}(z) \propto \frac{\pi}{2} - \sqrt{2} \sqrt{1-z} \left( 1 - \frac{z-1}{12} + \frac{3}{160} (z-1)^2 + \dots \right) ; (z \rightarrow 1)$$

01.12.06.0042.01

$$\sin^{-1}(z) \propto \frac{\pi}{2} - \sqrt{2} \sqrt{1-z} \left( 1 - \frac{z-1}{12} + \frac{3}{160} (z-1)^2 + O((z-1)^3) \right)$$

01.12.06.0010.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \sqrt{2} \sqrt{1-z} \sum_{k=0}^{\infty} \frac{\left(\frac{1}{2}\right)_k (1-z)^k}{2^k (2k+1) k!} ; |z-1| < 2$$

01.12.06.0043.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2 \sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right)$$

The last formula allows to express the function at the singular points  $z = 1$  through a function value at the regular point  $\tilde{z} = 0$ .

01.12.06.0011.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \sqrt{2} \sqrt{1-z} {}_2F_1\left(\frac{1}{2}, \frac{1}{2}; \frac{3}{2}; \frac{1-z}{2}\right)$$

01.12.06.0012.02

$$\sin^{-1}(z) \propto \frac{\pi}{2} - \sqrt{2} \sqrt{1-z} (1 + O(z-1))$$

01.12.06.0044.01

$$\sin^{-1}(z) = F_{\infty}(z) /; \left( F_n(z) = \frac{\pi}{2} - \sqrt{2} \sqrt{1-z} \sum_{k=0}^n \frac{\left(\frac{1}{2}\right)_k (1-z)^k}{2^k (2k+1) k!} = \right. \\ \left. \sin^{-1}(z) + \frac{\Gamma\left(n + \frac{3}{2}\right)^2 (2-2z)^{n+\frac{3}{2}}}{\pi (2n+3)!} {}_3F_2\left(1, n + \frac{3}{2}, n + \frac{3}{2}; n+2, n + \frac{5}{2}; \frac{1-z}{2}\right) \right) \wedge n \in \mathbb{N}$$

Summed form of the truncated series expansion.

### For small integer powers of the function

For the second power

01.12.06.0045.01

$$\sin^{-1}(z)^2 \propto \frac{\pi^2}{4} - \pi \sqrt{2} \sqrt{1-z} \left(1 - \frac{z-1}{12} + \frac{3}{160} (z-1)^2 + \dots\right) - 2(z-1) \left(1 - \frac{z-1}{6} + \frac{2}{45} (z-1)^2 + \dots\right) /; (z \rightarrow 1)$$

01.12.06.0046.01

$$\sin^{-1}(z)^2 \propto \frac{\pi^2}{4} - \pi \sqrt{2} \sqrt{1-z} \left(1 - \frac{z-1}{12} + \frac{3}{160} (z-1)^2 + O((z-1)^3)\right) - 2(z-1) \left(1 - \frac{z-1}{6} + \frac{2}{45} (z-1)^2 + O((z-1)^3)\right)$$

01.12.06.0047.01

$$\sin^{-1}(z)^2 = \frac{\pi^2}{4} - \pi \sqrt{2} \sqrt{1-z} \sum_{k=0}^{\infty} \frac{\left(\frac{1}{2}\right)_k (1-z)^k}{2^k (2k+1) k!} - 2(z-1) \left( \sum_{k=0}^{\infty} \frac{\left(\frac{1}{2}\right)_k (1-z)^k}{2^k (2k+1) k!} \right)^2 /; |z-1| < 2$$

01.12.06.0048.01

$$\sin^{-1}(z)^2 = \left( \frac{\pi}{2} - 2 \sin^{-1} \left( \sqrt{\frac{1-z}{2}} \right) \right)^2$$

The last formula allows to express the function at the singular points  $z = 1$  through a function value at the regular point  $\tilde{z} = 0$ .

01.12.06.0049.01

$$\sin^{-1}(z)^2 = \frac{\pi^2}{4} - \pi \sqrt{2} \sqrt{1-z} {}_2F_1\left(\frac{1}{2}, \frac{1}{2}; \frac{3}{2}; \frac{1-z}{2}\right) - 2(z-1) {}_2F_1\left(\frac{1}{2}, \frac{1}{2}; \frac{3}{2}; \frac{1-z}{2}\right)^2$$

01.12.06.0050.01

$$\sin^{-1}(z)^2 \propto \frac{\pi^2}{4} - \pi \sqrt{2} \sqrt{1-z} (1 + O(z-1)) - 2(z-1) (1 + O(z-1))$$

01.12.06.0051.01

$$\sin^{-1}(z)^2 = F_{\infty}(z) / ; \left( F_n(z) = \frac{\pi^2}{4} - \pi \sqrt{2} \sqrt{1-z} \sum_{k=0}^n \frac{\left(\frac{1}{2}\right)_k (1-z)^k}{2^k (2k+1) k!} - 2(z-1) \left( \sum_{k=0}^n \frac{\left(\frac{1}{2}\right)_k (1-z)^k}{2^k (2k+1) k!} \right)^2 = \right. \\ \left. \frac{\pi^2}{4} + \cos^{-1}(z)^2 - \pi \cos^{-1}(z) + \frac{2^{\frac{1}{2}-n} \Gamma\left(n + \frac{3}{2}\right)}{(2n+3) \sqrt{\pi} (n+1)!} (1-z)^{n+\frac{3}{2}} \sin^{-1}(z) {}_3F_2\left(1, n + \frac{3}{2}, n + \frac{3}{2}; n+2, n + \frac{5}{2}; \frac{1-z}{2}\right) + \right. \\ \left. \frac{2^{-2n-1} \Gamma\left(n + \frac{3}{2}\right)^2}{(2n+3)^2 \pi (n+1)!^2} (1-z)^{2n+3} {}_3F_2\left(1, n + \frac{3}{2}, n + \frac{3}{2}; n+2, n + \frac{5}{2}; \frac{1-z}{2}\right)^2 \right) \bigwedge n \in \mathbb{N}$$

Summed form of the truncated series expansion.

**Expansions at  $z = -1$**

**For the function itself**

01.12.06.0013.02

$$\sin^{-1}(z) \propto -\frac{\pi}{2} + \sqrt{2} \sqrt{1+z} \left( 1 + \frac{1+z}{12} + \frac{3}{160} (1+z)^2 + \dots \right) / ; (z \rightarrow -1)$$

01.12.06.0052.01

$$\sin^{-1}(z) \propto -\frac{\pi}{2} + \sqrt{2} \sqrt{1+z} \left( 1 + \frac{1+z}{12} + \frac{3}{160} (1+z)^2 + O((1+z)^3) \right)$$

01.12.06.0014.01

$$\sin^{-1}(z) = \sqrt{2} \sqrt{z+1} \sum_{k=0}^{\infty} \frac{\left(\frac{1}{2}\right)_k (z+1)^k}{2^k (2k+1) k!} - \frac{\pi}{2} / ; |z+1| < 2$$

01.12.06.0053.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + 2 \sin^{-1}\left(\sqrt{\frac{z+1}{2}}\right)$$

The last formula allows to express the function at the singular points  $z = -1$  through a function value at the regular point  $\tilde{z} = 0$ .

01.12.06.0015.01

$$\sin^{-1}(z) = \sqrt{2} \sqrt{z+1} {}_2F_1\left(\frac{1}{2}, \frac{1}{2}; \frac{3}{2}; \frac{z+1}{2}\right) - \frac{\pi}{2}$$

01.12.06.0016.02

$$\sin^{-1}(z) \propto -\frac{\pi}{2} + \sqrt{2} \sqrt{1+z} (1 + O(z+1))$$

01.12.06.0054.01

$$\sin^{-1}(z) = F_{\infty}(z) /; \left( F_n(z) = -\frac{\pi}{2} + \sqrt{2} \sqrt{z+1} \sum_{k=0}^n \frac{\left(\frac{1}{2}\right)_k (z+1)^k}{2^k (2k+1)k!} = \right. \\ \left. \sin^{-1}(z) - \frac{\Gamma\left(n + \frac{3}{2}\right)^2 (2z+2)^{n+\frac{3}{2}}}{\pi (2n+3)!} {}_3F_2\left(1, n + \frac{3}{2}, n + \frac{3}{2}; n+2, n + \frac{5}{2}; \frac{z+1}{2}\right) \right) \wedge n \in \mathbb{N}$$

Summed form of the truncated series expansion.

### For small integer powers of the function

For the second power

01.12.06.0055.01

$$\sin^{-1}(z)^2 \propto \frac{\pi^2}{4} - \pi \sqrt{2} \sqrt{z+1} \left(1 + \frac{z+1}{12} + \frac{3}{160} (z+1)^2 + \dots\right) + 2(z+1) \left(1 + \frac{z+1}{6} + \frac{2}{45} (z+1)^2 + \dots\right) /; (z \rightarrow -1)$$

01.12.06.0056.01

$$\sin^{-1}(z)^2 \propto \frac{\pi^2}{4} - \pi \sqrt{2} \sqrt{z+1} \left(1 + \frac{z+1}{12} + \frac{3}{160} (z+1)^2 + O((z+1)^3)\right) + 2(z+1) \left(1 + \frac{z+1}{6} + \frac{2}{45} (z+1)^2 + O((z+1)^3)\right)$$

01.12.06.0057.01

$$\sin^{-1}(z)^2 = \frac{\pi^2}{4} - \pi \sqrt{2} \sqrt{z+1} \sum_{k=0}^{\infty} \frac{\left(\frac{1}{2}\right)_k (z+1)^k}{2^k (2k+1)k!} + 2(z+1) \left( \sum_{k=0}^{\infty} \frac{\left(\frac{1}{2}\right)_k (z+1)^k}{2^k (2k+1)k!} \right)^2 /; |z+1| < 2$$

01.12.06.0058.01

$$\sin^{-1}(z)^2 = \left( \frac{\pi}{2} - 2 \sin^{-1} \left( \sqrt{\frac{z+1}{2}} \right) \right)^2$$

The last formula allows to express the function at the singular points  $z = -1$  through a function value at the regular point  $\tilde{z} = 0$ .

01.12.06.0059.01

$$\sin^{-1}(z)^2 = \frac{\pi^2}{4} - \pi \sqrt{2} \sqrt{z+1} {}_2F_1\left(\frac{1}{2}, \frac{1}{2}; \frac{3}{2}; \frac{z+1}{2}\right) + 2(z+1) {}_2F_1\left(\frac{1}{2}, \frac{1}{2}; \frac{3}{2}; \frac{z+1}{2}\right)^2$$

01.12.06.0060.01

$$\sin^{-1}(z)^2 \propto \frac{\pi^2}{4} - \pi \sqrt{2} \sqrt{z+1} (1 + O(z+1)) + 2(z+1) (1 + O(z+1))$$



01.12.06.0061.01

$$\sin^{-1}(z)^2 = F_\infty(z) /; \left( F_n(z) = \frac{\pi^2}{4} - \pi \sqrt{2} \sqrt{z+1} \sum_{k=0}^n \frac{\left(\frac{1}{2}\right)_k (z+1)^k}{2^k (2k+1) k!} + 2(z+1) \left( \sum_{k=0}^n \frac{\left(\frac{1}{2}\right)_k (z+1)^k}{2^k (2k+1) k!} \right)^2 = \right.$$

$$\sin^{-1}(z)^2 - \frac{2^{\frac{1}{2}-n} \Gamma\left(n + \frac{3}{2}\right)}{(2n+3) \sqrt{\pi} (n+1)!} (z+1)^{n+\frac{3}{2}} \sin^{-1}(z) {}_3F_2\left(1, n + \frac{3}{2}, n + \frac{3}{2}; n+2, n + \frac{5}{2}; \frac{z+1}{2}\right) +$$

$$\left. \frac{2^{-2n-1} \Gamma\left(n + \frac{3}{2}\right)^2}{(2n+3)^2 \pi (n+1)!^2} (z+1)^{2n+3} {}_3F_2\left(1, n + \frac{3}{2}, n + \frac{3}{2}; n+2, n + \frac{5}{2}; \frac{z+1}{2}\right)^2 \right) \bigwedge n \in \mathbb{N}$$

Summed form of the truncated series expansion.

Expansions at  $z = \infty$

### For the function itself

01.12.06.0017.02

$$\sin^{-1}(z) \propto \frac{z}{2\sqrt{-z^2}} \left( \log(-4z^2) - \frac{1}{2z^2} - \frac{3}{16z^4} - \dots \right) /; (|z| \rightarrow \infty)$$

01.12.06.0062.01

$$\sin^{-1}(z) \propto \frac{z}{2\sqrt{-z^2}} \left( \log(-4z^2) - \frac{1}{2z^2} - \frac{3}{16z^4} + O\left(\frac{1}{z^6}\right) \right)$$

01.12.06.0018.01

$$\sin^{-1}(z) = \frac{z}{2\sqrt{-z^2}} \left( \log(-4z^2) - \sum_{k=1}^{\infty} \frac{\left(\frac{1}{2}\right)_k z^{-2k}}{k k!} \right) /; |z| > 1$$

01.12.06.0019.01

$$\sin^{-1}(z) = \frac{z}{2\sqrt{-z^2}} \left( \log(-4z^2) - \frac{1}{2z^2} {}_3F_2\left(\frac{3}{2}, 1, 1; 2, 2; \frac{1}{z^2}\right) \right) /; z \notin (-1, 1)$$

01.12.06.0020.02

$$\sin^{-1}(z) \propto \frac{z \log(-4z^2)}{2\sqrt{-z^2}} - \frac{1}{4z\sqrt{-z^2}} \left( 1 + O\left(\frac{1}{z^2}\right) \right)$$

01.12.06.0063.01

$$\sin^{-1}(z) \propto \begin{cases} -i \log(z) & \arg(z) \leq 0 \\ i \log(z) & \text{True} \end{cases} /; (|z| \rightarrow \infty)$$

01.12.06.0064.01

$$\sin^{-1}(z) = F_{\infty}(z) /; \left( \left( F_n(z) = \frac{z}{2\sqrt{-z^2}} \left( \log(-4z^2) - \frac{1}{2z^2} \sum_{k=0}^n \frac{\left(\frac{3}{2}\right)_k z^{-2k}}{(k+1)^2 k!} \right) = \right. \right. \\ \left. \left. \sin^{-1}(z) + \frac{3z^{-2(n+2)} \left(\frac{5}{2}\right)_n}{4(n+2)^2(n+1)!} {}_3F_2\left(1, n + \frac{5}{2}, n+2; n+3, n+3; \frac{1}{z^2}\right) \right) \wedge n \in \mathbb{N} \right)$$

Summed form of the truncated series expansion.

### For small integer powers of the function

For the second power

01.12.06.0065.01

$$\sin^{-1}(z)^2 \propto -\frac{1}{4} \log^2(-z^2) + \log(-z^2) \left( -\log(2) + \frac{1}{4z^2} + \frac{3}{32z^4} + \dots \right) + \left( -\log^2(2) + \frac{\log(2)}{2z^2} + \frac{3\log(2)-1}{16z^4} + \dots \right) /; (|z| \rightarrow \infty)$$

01.12.06.0066.01

$$\sin^{-1}(z)^2 \propto -\frac{1}{4} \log^2(-z^2) + \log(-z^2) \left( -\log(2) + \frac{1}{4z^2} + \frac{3}{32z^4} + \mathcal{O}\left(\frac{1}{z^6}\right) \right) + \left( -\log^2(2) + \frac{\log(2)}{2z^2} + \frac{3\log(2)-1}{16z^4} + \mathcal{O}\left(\frac{1}{z^6}\right) \right)$$

01.12.06.0067.01

$$\sin^{-1}(z)^2 = -\frac{1}{4} \log^2(-4z^2) + \frac{\log(-z^2)}{4z^2} \sum_{k=0}^{\infty} \frac{\left(\frac{3}{2}\right)_k z^{-2k}}{(k+1)^2 k!} + \frac{1}{2z^2} \sum_{k=0}^{\infty} \frac{\left(\frac{3}{2}\right)_k z^{-2k}}{(k+1)^3 k!} - \frac{1}{4z^2} \sum_{k=0}^{\infty} \frac{\left(\frac{3}{2}\right)_k \left(\psi\left(-k - \frac{1}{2}\right) - \psi(k+1)\right) z^{-2k}}{(k+1)^2 k!} /; |z| > 1$$

01.12.06.0068.01

$$\sin^{-1}(z)^2 = -\frac{1}{4} \log^2(-4z^2) + \frac{\log(-4z^2)}{4z^2} \sum_{k=0}^{\infty} \frac{\left(\frac{3}{2}\right)_k z^{-2k}}{(k+1)^2 k!} - \frac{1}{16z^4} \left( \sum_{k=0}^{\infty} \frac{\left(\frac{3}{2}\right)_k z^{-2k}}{(k+1)^2 k!} \right)^2 /; |z| > 1$$

01.12.06.0069.01

$$\sin^{-1}(z)^2 = -\frac{1}{4} \log^2(-z^2) - \log\left(-\frac{z^2}{4}\right) \log\left(\sqrt{1 - \frac{1}{z^2}} + 1\right) - 2\log^2(2) - \\ \log^2\left(\sqrt{1 - \frac{1}{z^2}} + 1\right) + 2\text{Li}_2\left(\frac{1}{2} - \frac{1}{2}\sqrt{1 - \frac{1}{z^2}}\right) - \frac{1}{4z^2} \sum_{k=0}^{\infty} \frac{\left(\frac{3}{2}\right)_k \left(\psi\left(-k - \frac{1}{2}\right) - \psi(k+1)\right) z^{-2k}}{(k+1)^2 k!} /; |z| > 1$$

01.12.06.0070.01

$$\sin^{-1}(z)^2 = -\frac{1}{4} \log^2(-4z^2) + \frac{\log(-z^2)}{4z^2} {}_3F_2\left(\frac{3}{2}, 1, 1; 2, 2; \frac{1}{z^2}\right) + \\ \frac{1}{2z^2} {}_4F_3\left(\frac{3}{2}, 1, 1, 1; 2, 2, 2; \frac{1}{z^2}\right) - \frac{1}{4z^2} \sum_{k=0}^{\infty} \frac{\left(\frac{3}{2}\right)_k \left(\psi\left(-k - \frac{1}{2}\right) - \psi(k+1)\right) z^{-2k}}{(k+1)^2 k!} /; |z| > 1$$

01.12.06.0071.01

$$\sin^{-1}(z)^2 = -\frac{1}{4} \log^2(-4z^2) + \frac{\log(-4z^2)}{4z^2} {}_3F_2\left(\frac{3}{2}, 1, 1; 2, 2; \frac{1}{z^2}\right) - \frac{1}{16z^4} {}_3F_2\left(\frac{3}{2}, 1, 1; 2, 2; \frac{1}{z^2}\right)^2; z \notin (-1, 1)$$

01.12.06.0072.01

$$\sin^{-1}(z)^2 \propto -\frac{1}{4} \log^2(-z^2) - \log(-z^2) \log(2) \left(1 + \mathcal{O}\left(\frac{1}{z^2}\right)\right) - \log^2(2) \left(1 + \mathcal{O}\left(\frac{1}{z^2}\right)\right)$$

01.12.06.0073.01

$$\sin^{-1}(z)^2 \propto -\log^2(z); (|z| \rightarrow \infty)$$

01.12.06.0074.01

$$\begin{aligned} \sin^{-1}(z)^2 = F_\infty(z); & \left( F_n(z) = -\frac{\log^2(-4z^2)}{4} + \frac{\log(-4z^2)}{4z^2} \sum_{k=0}^n \frac{\left(\frac{3}{2}\right)_k z^{-2k}}{(k+1)^2 k!} - \frac{1}{16z^4} \left( \sum_{k=0}^n \frac{\left(\frac{3}{2}\right)_k z^{-2k}}{(k+1)^2 k!} \right)^2 = \right. \\ & \left. \frac{z^{-4(n+2)}}{16(n+2)^4(n+1)!^2} \left( 4(n+2)^2 \sin^{-1}(z)(n+1)! z^{2(n+2)} + 3 \left(\frac{5}{2}\right)_n {}_3F_2\left(1, n+2, n+\frac{5}{2}; n+3, n+3; \frac{1}{z^2}\right) \right) \bigwedge n \in \mathbb{N} \right) \end{aligned}$$

Summed form of the truncated series expansion.

## Residue representations

01.12.06.0021.01

$$\sin^{-1}(z) = -\frac{1}{2z\sqrt{\pi}} \sum_{j=1}^{\infty} \operatorname{res}_s \left( \frac{\Gamma\left(-s - \frac{1}{2}\right)^2 (-z^2)^{-s}}{\Gamma\left(\frac{1}{2} - s\right)} \Gamma(s+1) \right) (-j); |z| < 1$$

01.12.06.0022.01

$$\sin^{-1}(z) = -\frac{z}{2\sqrt{\pi}} \sum_{j=0}^{\infty} \operatorname{res}_s \left( \frac{\Gamma(s) (-z^2)^{-s}}{\Gamma\left(\frac{3}{2} - s\right)} \Gamma\left(\frac{1}{2} - s\right)^2 \right) \left(\frac{1}{2} + j\right); |z| > 1$$

## Limit representations

01.12.09.0001.01

$$\sin^{-1}(x) = \lim_{n \rightarrow \infty} y_n; \left( y_n = y_{n-1} + \frac{x - \sin(y_{n-1})}{\cos(y_{n-1})} \bigwedge y_0 = x \wedge x \in \mathbb{R} \wedge 0 < x < 1 \right)$$

P. W. Pedersen

## Integral representations

### On the real axis

#### Of the direct function

01.12.07.0001.01

$$\sin^{-1}(z) = z \int_0^1 \frac{1}{\sqrt{1-z^2 t^2}} dt$$

### Contour integral representations

01.12.07.0002.01

$$\sin^{-1}(z) = \frac{z}{(2\sqrt{\pi})2\pi i} \int_{\mathcal{L}} \frac{\Gamma(s)\Gamma\left(\frac{1}{2}-s\right)^2}{\Gamma\left(\frac{3}{2}-s\right)} (-z^2)^{-s} ds; |\arg(-z^2)| < \pi$$

01.12.07.0003.01

$$\sin^{-1}(z) = \frac{z}{(2\sqrt{\pi})2\pi i} \int_{\mathcal{L}} \Gamma(s)\Gamma\left(s+\frac{1}{2}\right)\Gamma\left(\frac{1}{2}-s\right)^2 (1-z^2)^{-s} ds; |\arg(1-z^2)| < \pi$$

01.12.07.0004.01

$$\sin^{-1}(z) = \frac{z}{(2\sqrt{\pi})2\pi i} \int_{\gamma-i\infty}^{\gamma+i\infty} \frac{\Gamma(s)\Gamma\left(\frac{1}{2}-s\right)^2}{\Gamma\left(\frac{3}{2}-s\right)} (-z^2)^{-s} ds; 0 < \gamma < \frac{1}{2} \wedge |\arg(-z^2)| < \pi$$

01.12.07.0005.01

$$\sin^{-1}(z) = \frac{z}{(2\sqrt{\pi})2\pi i} \int_{\gamma-i\infty}^{\gamma+i\infty} \Gamma(s)\Gamma\left(s+\frac{1}{2}\right)\Gamma\left(\frac{1}{2}-s\right)^2 (1-z^2)^{-s} ds; 0 < \gamma < \frac{1}{2} \wedge |\arg(1-z^2)| < \pi$$

### Continued fraction representations

01.12.10.0001.01

$$\sin^{-1}(z) = \frac{z\sqrt{1-z^2}}{1 - \frac{1 \times 2 z^2}{3 - \frac{1 \times 2 z^2}{5 - \frac{3 \times 4 z^2}{7 - \frac{3 \times 4 z^2}{9 - \frac{5 \times 6 z^2}{11 - \dots}}}}}; z \notin (-\infty, -1) \wedge z \notin (1, \infty)$$

01.12.10.0002.01

$$\sin^{-1}(z) = \frac{z\sqrt{1-z^2}}{1 + K_k\left(-2\left(2\left\lfloor\frac{k+1}{2}\right\rfloor - 1\right)\left\lfloor\frac{k+1}{2}\right\rfloor z^2, 2k+1\right)_1}; z \notin (-\infty, -1) \wedge z \notin (1, \infty)$$

### Differential equations

#### Ordinary linear differential equations and wronskians

For the direct function itself

01.12.13.0001.01

$$(1 - z^2)w''(z) - zw'(z) = 0 /; w(z) = \sin^{-1}(z) \wedge w(0) = 0 \wedge w'(0) = 1$$

01.12.13.0002.01

$$(1 - z^2)w''(z) - zw'(z) = 0 /; w(z) = c_1 + c_2 \sin^{-1}(z)$$

01.12.13.0003.01

$$W_z(1, \sin^{-1}(z)) = \frac{1}{\sqrt{1 - z^2}}$$

01.12.13.0004.01

$$\sqrt{1 - z^2} w'(z) = 1 /; w(z) = \sin^{-1}(z) \wedge w(0) = 0$$

## Transformations

### Transformations and argument simplifications

#### Argument involving basic arithmetic operations

#### Involving $\sin^{-1}(-z)$

#### Involving $\sin^{-1}(-z)$ and $\sin^{-1}(z)$

01.12.16.0001.01

$$\sin^{-1}(-z) = -\sin^{-1}(z)$$

#### Involving $\sin^{-1}(\sqrt{z^2})$

#### Involving $\sin^{-1}(\sqrt{z^2})$ and $\sin^{-1}(z)$

01.12.16.0018.01

$$\sin^{-1}(\sqrt{z^2}) = \sin^{-1}(z) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.16.0042.01

$$\sin^{-1}(\sqrt{z^2}) = -\sin^{-1}(z) /; \frac{\pi}{2} < \arg(z) \leq \pi \wedge -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.16.0019.01

$$\sin^{-1}(\sqrt{z^2}) = \frac{\sqrt{z^2}}{z} \sin^{-1}(z)$$

#### Involving $\sin^{-1}(a(bz^c)^m)$

Involving  $\sin^{-1}(a (b z^c)^m)$  and  $\sin^{-1}(a b^m z^{m c})$

01.12.16.0017.01

$$\sin^{-1}(a (b z^c)^m) = \frac{(b z^c)^m}{b^m z^{m c}} \sin^{-1}(a b^m z^{m c}) /; 2 m \in \mathbb{Z}$$

Involving  $\sin^{-1}(1 - 2 z^2)$

Involving  $\sin^{-1}(1 - 2 z^2)$  and  $\sin^{-1}(z)$

01.12.16.0003.01

$$\sin^{-1}(1 - 2 z^2) = \frac{\pi}{2} - 2 \sin^{-1}(z) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.16.0043.01

$$\sin^{-1}(1 - 2 z^2) = \frac{\pi}{2} + 2 \sin^{-1}(z) /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.16.0004.01

$$\sin^{-1}(1 - 2 z^2) = \frac{\pi}{2} - \frac{2 \sqrt{z^2}}{z} \sin^{-1}(z)$$

Involving  $\sin^{-1}(2 z^2 - 1)$

Involving  $\sin^{-1}(2 z^2 - 1)$  and  $\sin^{-1}(z)$

01.12.16.0044.01

$$\sin^{-1}(2 z^2 - 1) = -\frac{\pi}{2} + 2 \sin^{-1}(z) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.16.0045.01

$$\sin^{-1}(2 z^2 - 1) = -\frac{\pi}{2} - 2 \sin^{-1}(z) /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.16.0046.01

$$\sin^{-1}(2 z^2 - 1) = -\frac{\pi}{2} + \frac{2 \sqrt{z^2}}{z} \sin^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{z^2-2}{z^2}\right)$

Involving  $\sin^{-1}\left(\frac{z^2-2}{z^2}\right)$  and  $\sin^{-1}\left(\frac{1}{z}\right)$

01.12.16.0047.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = \frac{\pi}{2} - 2 \sin^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.16.0048.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = \frac{\pi}{2} + 2 \sin^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.16.0049.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = \frac{\pi}{2} - 2 \sqrt{\frac{1}{z^2}} z \sin^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(\frac{2-z^2}{z^2}\right)$

Involving  $\sin^{-1}\left(\frac{2-z^2}{z^2}\right)$  and  $\sin^{-1}\left(\frac{1}{z}\right)$

01.12.16.0050.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -\frac{\pi}{2} + 2 \sin^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.16.0051.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -\frac{\pi}{2} - 2 \sin^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.16.0052.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -\frac{\pi}{2} + 2 \sqrt{\frac{1}{z^2}} z \sin^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}(\sqrt{1-z})$

Involving  $\sin^{-1}(\sqrt{1-z})$  and  $\sin^{-1}(\sqrt{z})$

01.12.16.0005.01

$$\sin^{-1}(\sqrt{1-z}) = \frac{\pi}{2} - \sin^{-1}(\sqrt{z})$$

### Involving $\sin^{-1}\left(\sqrt{\frac{1+cz}{2}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1+z}{2}}\right)$  and  $\sin^{-1}(z)$

01.12.16.0006.01

$$\sin^{-1}\left(\sqrt{\frac{1+z}{2}}\right) = \frac{1}{2} \sin^{-1}(z) + \frac{\pi}{4}$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right)$  and  $\sin^{-1}(z)$

01.12.16.0007.01

$$\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right) = \frac{\pi}{4} - \frac{1}{2} \sin^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$  and  $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.16.0010.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\pi}{2} - \sin^{-1}\left(\frac{1}{\sqrt{z}}\right); |\arg(z)| < \pi$$

01.12.16.0053.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\pi}{2} + \sin^{-1}\left(\frac{1}{\sqrt{z}}\right); (z \in \mathbb{R} \wedge z < 0)$$

01.12.16.0011.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\pi}{2} - \sqrt{\frac{1}{z}} \sqrt{z} \sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$  and  $\sin^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.16.0054.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\pi}{2} - \sin^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$  and  $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.16.0055.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{\pi}{2} - \sin^{-1}\left(\frac{1}{\sqrt{z}}\right); z \notin (-\infty, 1)$$

01.12.16.0056.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \sin^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge 0 < z < 1)$$



01.12.16.0057.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \sin^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2} \quad ; (z \in \mathbb{R} \wedge z < 0)$$

01.12.16.0058.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{1}{2} \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} \pi - \sqrt{z-1} \sqrt{\frac{1}{z-1}} \sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$  and  $\sin^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.16.0059.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{\pi}{2} - \sin^{-1}\left(\sqrt{\frac{1}{z}}\right) \quad ; z \notin (0, 1)$$

01.12.16.0060.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \sin^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2} \quad ; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.16.0061.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{1}{2} \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} \pi - \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} \sin^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$  and  $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.16.0008.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\pi}{2} - \sin^{-1}\left(\frac{1}{\sqrt{z}}\right) \quad ; |\arg(z)| < \pi$$

01.12.16.0062.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\pi}{2} + \sin^{-1}\left(\frac{1}{\sqrt{z}}\right) \quad ; (z \in \mathbb{R} \wedge z < 0)$$

01.12.16.0009.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\pi}{2} - \sqrt{\frac{1}{z}} \sqrt{z} \sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$  and  $\sin^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.16.0063.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\pi}{2} - \sin^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z+a}}{\sqrt{2z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right)$  and  $\sin^{-1}\left(\frac{1}{z}\right)$

01.12.16.0016.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right) = \frac{\pi}{4} - \frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right)$  and  $\sin^{-1}\left(\frac{1}{z}\right)$

01.12.16.0013.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{4} /; z \notin (-1, 0)$$

01.12.16.0064.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = -\frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{4} /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.16.0014.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} \sqrt{1 + \frac{1}{z}} \sqrt{\frac{z}{z+1}} \left( \sin^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{a-z}}{\sqrt{-2z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right)$  and  $\sin^{-1}\left(\frac{1}{z}\right)$

01.12.16.0065.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = \frac{\pi}{4} - \frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right) /; z \notin (0, 1)$$

01.12.16.0066.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = \frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{4} /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.16.0067.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = \frac{1}{2} \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} \left( \frac{\pi}{2} - \sin^{-1}\left(\frac{1}{z}\right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-2z}}\right)$  and  $\sin^{-1}\left(\frac{1}{z}\right)$

01.12.16.0068.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-2z}}\right) = \frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{4}$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+a}{2z}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right)$  and  $\sin^{-1}\left(\frac{1}{z}\right)$

01.12.16.0015.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right) = \frac{\pi}{4} - \frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right)$  and  $\sin^{-1}\left(\frac{1}{z}\right)$

01.12.16.0012.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right) = \frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{4}$$

Involving  $\sin^{-1}\left(\sqrt{1-z^2}\right)$

Involving  $\sin^{-1}\left(\sqrt{1-z^2}\right)$  and  $\sin^{-1}(z)$

01.12.16.0020.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \frac{\pi}{2} - \sin^{-1}(z) \text{ ; } -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.16.0069.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \frac{\pi}{2} + \sin^{-1}(z) \text{ ; } \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.16.0021.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \frac{\pi}{2} - \frac{\sqrt{z^2}}{z} \sin^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$  and  $\sin^{-1}\left(\frac{1}{z}\right)$

01.12.16.0070.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi}{2} - \sin^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) > 0$$

01.12.16.0071.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -\frac{\pi}{2} - \sin^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) < 0$$

01.12.16.0072.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi}{2} + \sin^{-1}\left(\frac{1}{z}\right); (i z \in \mathbb{R} \wedge i z < 0)$$

01.12.16.0073.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \sin^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}; (i z \in \mathbb{R} \wedge i z > 0)$$

01.12.16.0023.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi \sqrt{z^2}}{2z} - \sin^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) \neq 0$$

01.12.16.0024.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi \sqrt{z^2}}{2z} - \sqrt{z^2} \sqrt{\frac{1}{z^2}} \sin^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$  and  $\sin^{-1}\left(\frac{1}{z}\right)$

01.12.16.0074.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi}{2} - \sin^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.16.0075.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi}{2} + \sin^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.16.0076.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi}{2} - z \sqrt{\frac{1}{z^2}} \sin^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$  and  $\sin^{-1}\left(\frac{1}{z}\right)$

01.12.16.0077.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi}{2} - \sin^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \leq \arg(z) < 0 \vee 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.16.0078.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \sin^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} /; \frac{\pi}{2} \leq \arg(z) < \pi \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.16.0079.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \sin^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.16.0080.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -\sin^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.16.0081.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \sqrt{1-\frac{1}{z^2}} \sqrt{\frac{z^2}{z^2-1}} \left(\frac{\pi}{2} - z \sqrt{\frac{1}{z^2}} \sin^{-1}\left(\frac{1}{z}\right)\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$  and  $\sin^{-1}\left(\frac{1}{z}\right)$

01.12.16.0082.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi}{2} - \sin^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.16.0083.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi}{2} + \sin^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.16.0084.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi}{2} - z \sqrt{\frac{1}{z^2}} \sin^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(2z\sqrt{1-z^2}\right)$

#### Involving $\sin^{-1}\left(2z\sqrt{1-z^2}\right)$ and $\sin^{-1}(z)$

01.12.16.0022.01

$$\sin^{-1}\left(2z\sqrt{1-z^2}\right) = 2\sin^{-1}(z); \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4}$$

01.12.16.0085.01

$$\begin{aligned} \sin^{-1}\left(2z\sqrt{1-z^2}\right) &= \frac{\pi\sqrt{1-2z^2}\sqrt{z^4-z^2}}{2\sqrt{-z^2}\sqrt{z^2-1}\sqrt{2z^2-1}} \\ &\left(\frac{\sqrt{z^2}}{z} - \sqrt{\frac{1}{z}}\sqrt{z}\sqrt{\frac{1}{\sqrt{2}z+1}}\sqrt{\sqrt{2}z+1} + \sqrt{-\frac{1}{z}}\sqrt{-z}\sqrt{\frac{1}{1-\sqrt{2}z}}\sqrt{1-\sqrt{2}z} + \frac{\sqrt{z^4-z^2}}{z\sqrt{z^2-1}}\right) - \\ &\frac{2\sqrt{1-2z^2}\sqrt{z^4-z^2}}{\sqrt{-z^2}\sqrt{z^2-1}\sqrt{2z^2-1}}\sin^{-1}(z) \end{aligned}$$

### Involving $\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right)$

#### Involving $\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right)$ and $\sin^{-1}\left(\frac{1}{z}\right)$

01.12.16.0086.01

$$\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = 2\sin^{-1}\left(\frac{1}{z}\right); \frac{\pi}{4} \leq |\arg(z)| < \frac{\pi}{2} \vee |z| \geq \sqrt{2} \wedge |\arg(z)| < \frac{\pi}{4}$$

01.12.16.0087.01

$$\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = \frac{2\sqrt{z^2}}{z}\sin^{-1}\left(\frac{1}{z}\right); \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4} \vee |z| \geq \sqrt{2}$$

01.12.16.0088.01

$$\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = -\frac{z^3\sqrt{z^2-2}\sqrt{z^2-1}}{2\sqrt{1-z}(z+1)\sqrt{-z^4+3z^2-2}}\sqrt{\frac{1-z^2}{z^4}}\sqrt{\frac{1}{z}}\sqrt{-\frac{z+1}{z}}\left(\pi\left(\frac{z^3}{1-z^2}\sqrt{\frac{1-z^2}{z^2}}\sqrt{\frac{1-z^2}{z^4}}+\sqrt{\frac{1}{z^2}}z-\sqrt{\frac{1}{z}}\sqrt{\frac{z}{z+\sqrt{2}}}\sqrt{\frac{z+\sqrt{2}}{z}}\sqrt{z}+\sqrt{1-\frac{\sqrt{2}}{z}}\sqrt{-\frac{1}{z}}\sqrt{-z}}\sqrt{\frac{z}{z-\sqrt{2}}}\right)-4\sin^{-1}\left(\frac{1}{z}\right)\right)$$

Involving  $\sin^{-1}\left(\sqrt{\left(1-\sqrt{1+cz^2}\right)/2}\right)$

Involving  $\sin^{-1}\left(\sqrt{\left(1-\sqrt{1+z^2}\right)/2}\right)$  and  $\sin^{-1}(iz)$

01.12.16.0025.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+z^2}}{2}}\right) = \frac{1}{2}\sin^{-1}(iz); -\pi < \arg(z) \leq 0$$

01.12.16.0089.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{z^2+1}\right)}\right) = -\frac{1}{2}\sin^{-1}(iz); 0 < \arg(z) \leq \pi$$

Involving  $\sin^{-1}\left(\sqrt{\left(1-\sqrt{1-z^2}\right)/2}\right)$  and  $\sin^{-1}(z)$

01.12.16.0026.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2}}\right) = \frac{1}{2}\sin^{-1}(z); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.16.0090.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{1-z^2}\right)}\right) = -\frac{1}{2}\sin^{-1}(z); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

$$\sin^{-1} \left( \sqrt{\frac{1 - \sqrt{1 - z^2}}{2}} \right) = \frac{\sqrt{z^2}}{2z} \sin^{-1}(z)$$

Involving  $\sin^{-1} \left( z \sqrt{1 - \sqrt{1 - z^2}} / \sqrt{2 z^2} \right)$

Involving  $\sin^{-1} \left( z \sqrt{1 - \sqrt{1 - z^2}} / \sqrt{2 z^2} \right)$  and  $\sin^{-1}(z)$

$$\sin^{-1} \left( \frac{z \sqrt{1 - \sqrt{1 - z^2}}}{\sqrt{2} \sqrt{z^2}} \right) = \frac{1}{2} \sin^{-1}(z)$$

Involving  $\sin^{-1} \left( z \sqrt{(1 - \sqrt{1 - z^2}) / (2 z^2)} \right)$

Involving  $\sin^{-1} \left( z \sqrt{(1 - \sqrt{1 - z^2}) / (2 z^2)} \right)$  and  $\sin^{-1}(z)$

$$\sin^{-1} \left( z \sqrt{\frac{1 - \sqrt{1 - z^2}}{2 z^2}} \right) = \frac{1}{2} \sin^{-1}(z)$$

Involving  $\sin^{-1} \left( \sqrt{z - \sqrt{z^2 - 1}} / \sqrt{2 z} \right)$

Involving  $\sin^{-1} \left( \sqrt{z - \sqrt{z^2 - 1}} / \sqrt{2 z} \right)$  and  $\sin^{-1}(\frac{1}{z})$



01.12.16.0092.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = \frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.16.0093.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = \frac{\pi}{2} + \frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} < \arg(z) < \pi \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.16.0094.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = -\frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.16.0095.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = \frac{\pi}{2} - \frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right); (iz \in \mathbb{R} \wedge iz > 0)$$

01.12.16.0096.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = \sqrt{z} \sqrt{\frac{1}{z}} \sqrt{z+1} \sqrt{\frac{1}{z+1}} \left( \frac{1}{2} \sqrt{-iz} \sqrt{-\frac{1}{iz}} \sin^{-1}\left(\frac{1}{z}\right) - \frac{1}{4} \pi \left( \frac{\sqrt{z^2}}{z} - 1 \right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right)$  and  $\sin^{-1}\left(\frac{1}{z}\right)$

01.12.16.0097.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) > 0$$

01.12.16.0098.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2}; \operatorname{Re}(z) < 0$$

01.12.16.0099.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = -\frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right); (i z \in \mathbb{R} \wedge i z < 0)$$

01.12.16.0100.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{\pi}{2} - \frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right); (i z \in \mathbb{R} \wedge i z > 0)$$

01.12.16.0029.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2} \sin^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{4} \left(\frac{\sqrt{z^2}}{z} - 1\right); \operatorname{Re}(z) \neq 0$$

01.12.16.0101.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2} \sqrt{z^2} \sqrt{\frac{1}{z^2}} \sin^{-1}\left(\frac{1}{z}\right) - \frac{1}{4} \pi \left(\frac{\sqrt{z^2}}{z} - 1\right)$$

Involving  $\sin^{-1}\left(c z^{-r} \sqrt{-1 + \frac{z^{2r}}{c^2}}\right)$

Involving  $\sin^{-1}\left(c z^{-r} \sqrt{-1 + \frac{z^{2r}}{c^2}}\right)$  and  $\sin^{-1}\left(\frac{c}{z^r}\right)$

01.12.16.0102.01

$$\sin^{-1}\left(c z^{-r} \sqrt{\frac{z^{2r}}{c^2} - 1}\right) = \sqrt{c^2 z^{-2r}} \sqrt{\frac{z^{2r}}{c^2}} \left(\frac{\pi z^r \sqrt{c^2 z^{-2r}}}{2c} - \sin^{-1}\left(\frac{c}{z^r}\right)\right)$$

## Products, sums, and powers of the direct function

### Sums of the direct function

01.12.16.0103.01

$$\sin^{-1}(x) + \sin^{-1}(y) = \pi \operatorname{sgn}(x+y) - \cos^{-1}\left(x y - \sqrt{1-x^2} \sqrt{1-y^2}\right) \operatorname{sgn}(x+y); -1 < x < 1 \vee -1 < y < 1 \vee x y > 0$$

01.12.16.0030.01

$$\sin^{-1}(x) + \sin^{-1}(y) = \operatorname{sgn}(x+y) \cos^{-1}\left(\sqrt{1-x^2} \sqrt{1-y^2} - x y\right); x > -1 \wedge y > -1 \vee x < 1 \wedge y < 1$$

01.12.16.0031.01

$$\sin^{-1}(x) + \sin^{-1}(y) = -\operatorname{sgn}(x+y) \cos^{-1}\left(\sqrt{1-x^2} \sqrt{1-y^2} - xy\right); x > 1 \wedge y < -1 \vee x < -1 \wedge y > 1$$

01.12.16.0032.01

$$\sin^{-1}(x) + \sin^{-1}(y) = \sin^{-1}\left(y \sqrt{1-x^2} + x \sqrt{1-y^2}\right); xy \leq 0 \vee x^2 + y^2 \leq 1$$

01.12.16.0033.01

$$\sin^{-1}(x) + \sin^{-1}(y) = \operatorname{sgn}(x) \pi - \sin^{-1}\left(y \sqrt{1-x^2} + x \sqrt{1-y^2}\right); xy > 0 \wedge x^2 + y^2 > 1$$

01.12.16.0036.01

$$\sin^{-1}(x) + \sin^{-1}(y) = \tan^{-1}\left(\frac{y \sqrt{1-x^2} + x \sqrt{1-y^2}}{\sqrt{1-y^2} \sqrt{1-x^2} - xy}\right); xy < 0 \vee x^2 + y^2 \leq 1$$

01.12.16.0037.01

$$\sin^{-1}(x) + \sin^{-1}(y) = \tan^{-1}\left(\frac{y \sqrt{1-x^2} + x \sqrt{1-y^2}}{\sqrt{1-y^2} \sqrt{1-x^2} - xy}\right) + \pi \operatorname{sgn}(x); xy > 0 \wedge x^2 + y^2 > 1$$

01.12.16.0104.01

$$\sin^{-1}(x) + \sin^{-1}(y) =$$

$$\frac{\sqrt{1-x^2} \sqrt{1-y^2} - xy}{\sqrt{(\sqrt{1-x^2} \sqrt{1-y^2} - xy)^2}} \sin^{-1}\left(x \sqrt{1-y^2} + y \sqrt{1-x^2}\right) + \frac{\pi}{2} \left(1 - \frac{\sqrt{1-x^2} \sqrt{1-y^2} - xy}{\sqrt{(\sqrt{1-x^2} \sqrt{1-y^2} - xy)^2}}\right) +$$

$$\pi \left(1 - \frac{\sqrt{1-x^2} \sqrt{1-y^2} - xy}{\sqrt{(\sqrt{1-x^2} \sqrt{1-y^2} - xy)^2}}\right) \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(iy + \sqrt{1-y^2}\right)}{2\pi} \right] -$$

$$\pi \left(1 + \frac{\sqrt{1-x^2} \sqrt{1-y^2} - xy}{\sqrt{(\sqrt{1-x^2} \sqrt{1-y^2} - xy)^2}}\right) \left[ \frac{\pi - \arg\left(ix + \sqrt{1-x^2}\right) - \arg\left(iy + \sqrt{1-y^2}\right)}{2\pi} \right]$$

01.12.16.0105.01

$$\sin^{-1}(x) + \sin^{-1}(y) = \sin^{-1} \left( (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} \sqrt{1-y^2} - xy)}{\pi} \right\rfloor} \left( \sqrt{1-y^2} x + \sqrt{1-x^2} y \right) \right) -$$

$$\frac{1}{2} \pi \left( 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} \sqrt{1-y^2} - xy)}{\pi} \right\rfloor} \right) \left\lfloor \frac{\arg(i x + \sqrt{1-x^2}) + \arg(i y + \sqrt{1-y^2})}{2 \pi} \right\rfloor + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} \sqrt{1-y^2} - xy)}{\pi} \right\rfloor} \right) +$$

$$2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} \sqrt{1-y^2} - xy)}{\pi} \right\rfloor} \right) \left\lfloor \frac{1}{2} - \frac{\arg(i x + \sqrt{1-x^2}) + \arg(i y + \sqrt{1-y^2})}{2 \pi} \right\rfloor - 1 \right)$$

**Differences of the direct function**

01.12.16.0106.01

$$\sin^{-1}(x) - \sin^{-1}(y) = \operatorname{sgn}(x-y) \cos^{-1} \left( x y + \sqrt{1-x^2} \sqrt{1-y^2} \right); -1 < x < 1 \vee -1 < y < 1 \vee x y < 0$$

01.12.16.0107.01

$$\sin^{-1}(x) - \sin^{-1}(y) = \operatorname{sgn}(x-y) \cos^{-1} \left( \sqrt{1-x^2} \sqrt{1-y^2} + x y \right); x > -1 \wedge y < 1 \vee x < 1 \wedge y > -1$$

01.12.16.0108.01

$$\sin^{-1}(x) - \sin^{-1}(y) = -\operatorname{sgn}(x-y) \cos^{-1} \left( \sqrt{1-x^2} \sqrt{1-y^2} + x y \right); x > 1 \wedge y > 1 \vee x < -1 \wedge y < -1$$

01.12.16.0034.01

$$\sin^{-1}(x) - \sin^{-1}(y) = \sin^{-1} \left( x \sqrt{1-y^2} - y \sqrt{1-x^2} \right); x y \geq 0 \vee x^2 + y^2 \leq 1$$

01.12.16.0035.01

$$\sin^{-1}(x) - \sin^{-1}(y) = \operatorname{sgn}(x) \pi - \sin^{-1} \left( x \sqrt{1-y^2} - y \sqrt{1-x^2} \right); x y < 0 \wedge x^2 + y^2 > 1$$

01.12.16.0109.01

$$\sin^{-1}(x) - \sin^{-1}(y) = \tan^{-1} \left( \frac{x \sqrt{1-y^2} - y \sqrt{1-x^2}}{\sqrt{1-y^2} \sqrt{1-x^2} + x y} \right); x y > 0 \vee x^2 + y^2 \leq 1$$

01.12.16.0110.01

$$\sin^{-1}(x) - \sin^{-1}(y) = \tan^{-1} \left( \frac{x \sqrt{1-y^2} - y \sqrt{1-x^2}}{\sqrt{1-y^2} \sqrt{1-x^2} + x y} \right) + \pi \operatorname{sgn}(x); x y < 0 \wedge x^2 + y^2 > 1$$

01.12.16.0111.01

$$\sin^{-1}(x) - \sin^{-1}(y) =$$

$$\frac{\sqrt{1-x^2} \sqrt{1-y^2} + xy}{\sqrt{(\sqrt{1-x^2} \sqrt{1-y^2} + xy)^2}} \sin^{-1}\left(x \sqrt{1-y^2} - y \sqrt{1-x^2}\right) + \frac{\pi}{2} \left(1 - \frac{\sqrt{1-x^2} \sqrt{1-y^2} + xy}{\sqrt{(\sqrt{1-x^2} \sqrt{1-y^2} + xy)^2}}\right) +$$

$$\pi \left(1 - \frac{\sqrt{1-x^2} \sqrt{1-y^2} + xy}{\sqrt{(\sqrt{1-x^2} \sqrt{1-y^2} + xy)^2}}\right) \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(-iy + \sqrt{1-y^2}\right)}{2\pi} \right] -$$

$$\pi \left(1 + \frac{\sqrt{1-x^2} \sqrt{1-y^2} + xy}{\sqrt{(\sqrt{1-x^2} \sqrt{1-y^2} + xy)^2}}\right) \left[ \frac{\pi - \arg\left(ix + \sqrt{1-x^2}\right) - \arg\left(-iy + \sqrt{1-y^2}\right)}{2\pi} \right]$$

01.12.16.0112.01

$$\sin^{-1}(x) - \sin^{-1}(y) = \sin^{-1} \left( (-1)^{\lfloor \frac{1}{2} - \frac{\arg(xy + \sqrt{1-x^2} \sqrt{1-y^2})}{\pi} \rfloor} \left( x \sqrt{1-y^2} - \sqrt{1-x^2} y \right) \right) -$$

$$\frac{1}{2} \pi \left( 2 \left( -1 + (-1)^{\lfloor \frac{1}{2} - \frac{\arg(xy + \sqrt{1-x^2} \sqrt{1-y^2})}{\pi} \rfloor} \right) \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1-y^2} - iy\right)}{2\pi} \right] + (-1)^{\lfloor \frac{1}{2} - \frac{\arg(xy + \sqrt{1-x^2} \sqrt{1-y^2})}{\pi} \rfloor} \right) +$$

$$2 \left( 1 + (-1)^{\lfloor \frac{1}{2} - \frac{\arg(xy + \sqrt{1-x^2} \sqrt{1-y^2})}{\pi} \rfloor} \right) \left[ \frac{1}{2} - \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1-y^2} - iy\right)}{2\pi} \right] - 1$$

**Linear combinations of the direct function**

01.12.16.0113.01

$$a \sin^{-1}(x) + b \sin^{-1}(y) =$$

$$\log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(iy + \sqrt{1-y^2}\right)^{-ib}\right) - 2i\pi \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left(\left(iy + \sqrt{1-y^2}\right)^{-ib}\right) + \pi}{2\pi} \right] +$$

$$\left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(b \log\left(iy + \sqrt{1-y^2}\right)\right) + \pi}{2\pi} \right]$$

01.12.16.0114.01

$$a \sin^{-1}(x) + b \sin^{-1}(y) = i\pi \left[ 1 - (-1)^{\left\lfloor \frac{\arg\left(\left(iy + \sqrt{1-y^2}\right)^{-ib} \left(ix + \sqrt{1-x^2}\right)^{-ia} + 1\right)}{2\pi} \right\rfloor} - \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(iy + \sqrt{1-y^2}\right)^{-ib}\right)}{2\pi} \right] +$$

$$i(-1)^{\left\lfloor \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(iy + \sqrt{1-y^2}\right)^{-ib} - 1\right)}{2\pi} + \frac{1}{2} - \frac{\arg\left(\left(iy + \sqrt{1-y^2}\right)^{-ib} \left(ix + \sqrt{1-x^2}\right)^{-ia} + 1\right)}{2\pi} \right\rfloor} + \left[ \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(iy + \sqrt{1-y^2}\right)^{-ib}\right)}{\pi} \right]$$

$$\left( \sin^{-1}\left(\frac{1}{2} \left(ix + \sqrt{1-x^2}\right)^{ia} \left(iy + \sqrt{1-y^2}\right)^{ib} \left(\left(iy + \sqrt{1-y^2}\right)^{-2ib} \left(ix + \sqrt{1-x^2}\right)^{-2ia} + 1\right)\right) - \frac{\pi}{2} \right) -$$

$$2i\pi \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left(\left(iy + \sqrt{1-y^2}\right)^{-ib}\right) + \pi}{2\pi} \right] +$$

$$\left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(b \log\left(iy + \sqrt{1-y^2}\right)\right) + \pi}{2\pi} \right]$$

### Related transformations

#### Sums involving the direct function

#### Involving log(z)

01.12.16.0115.01

$$\sin^{-1}(x) + \log(y) = \log\left(\left(ix + \sqrt{1-x^2}\right)^{-i} y\right) - 2i\pi \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i}\right) - \arg(y) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(\log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}(\log(y))}{2\pi} \right]$$

01.12.16.0116.01

$$\sin^{-1}(x) + \log(y) = i\pi \left[ 1 - (-1)^{\left\lfloor \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i} + 1\right)}{2\pi} \right\rfloor} \right] \left[ -\frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i} y\right)}{2\pi} \right] + i(-1)^{\left\lfloor \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i} y^{-1}\right)}{2\pi} + \frac{1}{2} - \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i} + 1\right)}{2\pi} \right\rfloor} \right] \left[ -\frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i} y\right)}{\pi} \right] \left[ \sin^{-1}\left(\frac{\left(ix + \sqrt{1-x^2}\right)^i \left(y^2 \left(ix + \sqrt{1-x^2}\right)^{-2i} + 1\right)}{2y}\right) - \frac{\pi}{2} \right] - 2i\pi \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i}\right) - \arg(y) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(\log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}(\log(y))}{2\pi} \right]$$

### Involving $\cos^{-1}(z)$

01.12.16.0038.01

$$\cos^{-1}(y) + \sin^{-1}(x) = \cos^{-1}\left(xy + \sqrt{1-x^2} \sqrt{1-y^2}\right) \operatorname{sgn}(x-y) + \frac{\pi}{2}; -1 < x < 1 \vee -1 < y < 1 \vee xy < 0$$

01.12.16.0117.01

$$\sin^{-1}(x) + \cos^{-1}(y) = \operatorname{sgn}(x-y) \cos^{-1}\left(\sqrt{1-x^2} \sqrt{1-y^2} + xy\right) + \frac{\pi}{2}; x > -1 \wedge y < 1 \vee x < 1 \wedge y > -1$$

01.12.16.0118.01

$$\sin^{-1}(x) + \cos^{-1}(y) = -\operatorname{sgn}(x-y) \cos^{-1}\left(\sqrt{1-x^2} \sqrt{1-y^2} + xy\right) + \frac{\pi}{2}; x > 1 \wedge y > 1 \vee x < -1 \wedge y < -1$$

01.12.16.0119.01

$$\sin^{-1}(x) + \cos^{-1}(y) = \sin^{-1}\left(x \sqrt{1-y^2} - y \sqrt{1-x^2}\right) + \frac{\pi}{2}; xy \geq 0 \vee x^2 + y^2 \leq 1$$

01.12.16.0120.01

$$\sin^{-1}(x) + \cos^{-1}(y) = \frac{\pi}{2} + \operatorname{sgn}(x) \pi - \sin^{-1}\left(x \sqrt{1-y^2} - y \sqrt{1-x^2}\right); xy < 0 \wedge x^2 + y^2 > 1$$

01.12.16.0121.01

$$\sin^{-1}(x) + \cos^{-1}(y) = \tan^{-1} \left( \frac{x \sqrt{1-y^2} - y \sqrt{1-x^2}}{\sqrt{1-y^2} \sqrt{1-x^2} + xy} \right) + \frac{\pi}{2}; xy > 0 \vee x^2 + y^2 \leq 1$$

01.12.16.0122.01

$$\sin^{-1}(x) + \cos^{-1}(y) = \tan^{-1} \left( \frac{x \sqrt{1-y^2} - y \sqrt{1-x^2}}{\sqrt{1-y^2} \sqrt{1-x^2} + xy} \right) + \pi \operatorname{sgn}(x) + \frac{\pi}{2}; xy < 0 \wedge x^2 + y^2 > 1$$

01.12.16.0123.01

$$\sin^{-1}(x) + \cos^{-1}(y) = -\frac{xy + \sqrt{1-x^2} \sqrt{1-y^2}}{\sqrt{(xy + \sqrt{1-x^2} \sqrt{1-y^2})^2}} \sin^{-1} \left( \frac{\sqrt{1-x^2} y - x \sqrt{1-y^2}}{\sqrt{(xy + \sqrt{1-x^2} \sqrt{1-y^2})^2}} \right) + \frac{\pi(xy + \sqrt{1-x^2} \sqrt{1-y^2})}{2\sqrt{(xy + \sqrt{1-x^2} \sqrt{1-y^2})^2}} +$$

$$\pi \left( \frac{xy + \sqrt{1-x^2} \sqrt{1-y^2}}{\sqrt{(xy + \sqrt{1-x^2} \sqrt{1-y^2})^2}} + 1 \right) \left[ \frac{-\arg(\sqrt{1-x^2} - ix) - \arg(iy + \sqrt{1-y^2}) + \pi}{2\pi} \right] -$$

$$\pi \left( 1 - \frac{xy + \sqrt{1-x^2} \sqrt{1-y^2}}{\sqrt{(xy + \sqrt{1-x^2} \sqrt{1-y^2})^2}} \right) \left[ \frac{\arg(\sqrt{1-x^2} - ix) + \arg(iy + \sqrt{1-y^2})}{2\pi} \right]$$

01.12.16.0124.01

$$\sin^{-1}(x) + \cos^{-1}(y) = \sin^{-1} \left( (-1)^{\lfloor \frac{1}{2} - \frac{\arg(xy + \sqrt{1-x^2} \sqrt{1-y^2})}{\pi} \rfloor} \left( x \sqrt{1-y^2} - \sqrt{1-x^2} y \right) \right) -$$

$$\frac{1}{2} \pi \left( 2 \left( -1 + (-1)^{\lfloor \frac{1}{2} - \frac{\arg(xy + \sqrt{1-x^2} \sqrt{1-y^2})}{\pi} \rfloor} \right) \left[ \frac{\arg(ix + \sqrt{1-x^2}) + \arg(\sqrt{1-y^2} - iy)}{2\pi} \right] + (-1)^{\lfloor \frac{1}{2} - \frac{\arg(xy + \sqrt{1-x^2} \sqrt{1-y^2})}{\pi} \rfloor} \right) +$$

$$2 \left( 1 + (-1)^{\lfloor \frac{1}{2} - \frac{\arg(xy + \sqrt{1-x^2} \sqrt{1-y^2})}{\pi} \rfloor} \right) \left[ \frac{1}{2} - \frac{\arg(ix + \sqrt{1-x^2}) + \arg(\sqrt{1-y^2} - iy)}{2\pi} \right]$$

### Involving $\tan^{-1}(z)$



01.12.16.0125.01

$$\sin^{-1}(x) + \tan^{-1}(y) = \frac{1}{2\sqrt{\frac{(x+\sqrt{1-x^2}y)^2}{y^2+1}}\sqrt{y^2+1}} \left( (x+\sqrt{1-x^2}y) \left( \pi - 2 \sin^{-1} \left( \frac{\sqrt{1-x^2}-xy}{\sqrt{y^2+1}} \right) \right) + \right.$$

$$2\pi \left( x+\sqrt{1-x^2}y + \sqrt{\frac{-y^2x^2+x^2+2\sqrt{1-x^2}yx+y^2}{y^2+1}}\sqrt{y^2+1} \right) \left[ \frac{\arg(ix+\sqrt{1-x^2}) + \arg\left(\frac{i-y}{\sqrt{y^2+1}}\right)}{2\pi} \right] -$$

$$2\pi \left( -x-\sqrt{1-x^2}y + \sqrt{\frac{-y^2x^2+x^2+2\sqrt{1-x^2}yx+y^2}{y^2+1}}\sqrt{y^2+1} \right) \left[ \frac{\arg(ix+\sqrt{1-x^2}) + \arg\left(\frac{i-y}{\sqrt{y^2+1}}\right) - \pi}{2\pi} \right] \right)$$

01.12.16.0126.01

$$\sin^{-1}(x) + \tan^{-1}(y) = \sin^{-1} \left( \frac{(-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x+\sqrt{1-x^2}y}{\sqrt{y^2+1}}\right)}{\pi} \rfloor} (xy - \sqrt{1-x^2})}{\sqrt{y^2+1}} \right) + \frac{1}{2}\pi \left( 2 \left( 1 + (-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x+\sqrt{1-x^2}y}{\sqrt{y^2+1}}\right)}{\pi} \rfloor} \right) \left[ \frac{\arg(ix+\sqrt{1-x^2}) + \arg\left(\frac{i-y}{\sqrt{y^2+1}}\right)}{2\pi} \right] + \right.$$

$$\left. (-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x+\sqrt{1-x^2}y}{\sqrt{y^2+1}}\right)}{\pi} \rfloor} - 2 \left( -1 + (-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x+\sqrt{1-x^2}y}{\sqrt{y^2+1}}\right)}{\pi} \rfloor} \right) \left[ \frac{\arg(ix+\sqrt{1-x^2}) + \arg\left(\frac{i-y}{\sqrt{y^2+1}}\right)}{2\pi} \right] \right)$$

Involving  $\cot^{-1}(z)$

01.12.16.0127.01

$$\sin^{-1}(x) + \cot^{-1}(y) = \frac{1}{2\sqrt{1+\frac{1}{y^2}}y\sqrt{\frac{(xy+\sqrt{1-x^2})^2}{y^2+1}}}\left(xy+\sqrt{1-x^2}\right)\left(\pi-2\sin^{-1}\left(\frac{\sqrt{1-x^2}-\frac{x}{y}}{\sqrt{1+\frac{1}{y^2}}}\right)\right)+$$

$$2\pi\left(xy+\sqrt{\frac{(y^2-1)x^2+2\sqrt{1-x^2}yx+1}{y^2+1}}\sqrt{1+\frac{1}{y^2}}y+\sqrt{1-x^2}\right)\left[\frac{\arg\left(ix+\sqrt{1-x^2}\right)+\arg\left(\frac{i-\frac{1}{y}}{\sqrt{1+\frac{1}{y^2}}}\right)}{2\pi}\right]+$$

$$2\pi\left(xy-\sqrt{1+\frac{1}{y^2}}\sqrt{\frac{(y^2-1)x^2+2\sqrt{1-x^2}yx+1}{y^2+1}}y+\sqrt{1-x^2}\right)\left[\frac{\arg\left(ix+\sqrt{1-x^2}\right)+\arg\left(\frac{i-\frac{1}{y}}{\sqrt{1+\frac{1}{y^2}}}\right)-\pi}{2\pi}\right]$$

01.12.16.0128.01

$$\sin^{-1}(x) + \cot^{-1}(y) =$$

$$\sin^{-1} \left( \frac{(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x + \sqrt{1-x^2}}{y} \right)}{\pi} \right\rfloor} \left( \frac{x}{y} - \sqrt{1-x^2} \right)}{\sqrt{1 + \frac{1}{y^2}}} \right) + \frac{1}{2} \pi \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x + \sqrt{1-x^2}}{y} \right)}{\pi} \right\rfloor} \frac{\arg \left( i x + \sqrt{1-x^2} \right) + \arg \left( \frac{i - \frac{1}{y}}{\sqrt{1 + \frac{1}{y^2}}} \right)}{2 \pi} \right)$$

$$(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x + \sqrt{1-x^2}}{y} \right)}{\pi} \right\rfloor} - 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x + \sqrt{1-x^2}}{y} \right)}{\pi} \right\rfloor} \frac{1}{2} - \frac{\arg \left( i x + \sqrt{1-x^2} \right) + \arg \left( \frac{i - \frac{1}{y}}{\sqrt{1 + \frac{1}{y^2}}} \right)}{2 \pi} \right)$$

Involving  $\csc^{-1}(z)$

01.12.16.0129.01

$$\sin^{-1}(x) + \csc^{-1}(y) = \frac{\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2} - \frac{x}{y}}}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2} - \frac{x}{y}}\right)^2}} \sin^{-1}\left(\sqrt{1-\frac{1}{y^2}} x + \frac{\sqrt{1-x^2}}{y}\right) +$$

$$\pi \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)}{2\pi} \right] \left[ \frac{x - \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} y}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2} - \frac{x}{y}}\right)^2}} + 1 \right] +$$

$$\frac{1}{2} \pi \left[ \frac{x - \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} y}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2} - \frac{x}{y}}\right)^2}} + 1 \right] -$$

$$\pi \left[ \frac{\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2} - \frac{x}{y}}}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2} - \frac{x}{y}}\right)^2}} + 1 \right] \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right) - \pi}{2\pi} \right]$$

01.12.16.0130.01

$$\sin^{-1}(x) + \csc^{-1}(y) = \sin^{-1} \left( (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} - \frac{x}{y} \right)}{\pi} \right\rfloor} \left( \sqrt{1-\frac{1}{y^2}} x + \frac{\sqrt{1-x^2}}{y} \right) \right) -$$

$$\frac{1}{2} \pi \left( 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} - \frac{x}{y} \right)}{\pi} \right\rfloor} \right) \left[ \frac{\arg \left( i x + \sqrt{1-x^2} \right) + \arg \left( \sqrt{1-\frac{1}{y^2}} + \frac{i}{y} \right)}{2 \pi} \right] + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} - \frac{x}{y} \right)}{\pi} \right\rfloor} \right) +$$

$$2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} - \frac{x}{y} \right)}{\pi} \right\rfloor} \right) \left[ \frac{1}{2} - \frac{\arg \left( i x + \sqrt{1-x^2} \right) + \arg \left( \sqrt{1-\frac{1}{y^2}} + \frac{i}{y} \right)}{2 \pi} \right] - 1 \right)$$

### Involving $\sec^{-1}(z)$

01.12.16.0131.01

$$\sin^{-1}(x) + \sec^{-1}(y) = \pi \left[ \frac{\arg \left( i x + \sqrt{1-x^2} \right) + \arg \left( \sqrt{1-\frac{1}{y^2}} - \frac{i}{y} \right)}{2 \pi} \right] \left[ 1 - \frac{x + \sqrt{1-x^2} y \sqrt{1-\frac{1}{y^2}}}{\sqrt{\left( \frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} \right)^2} y} \right] +$$

$$\frac{1}{2} \pi \left( 2 - \frac{x + \sqrt{1-x^2} y \sqrt{1-\frac{1}{y^2}}}{\sqrt{\left( \frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} \right)^2} y} \right) + \frac{\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}}{\sqrt{\left( \frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} \right)^2}} \sin^{-1} \left( x \sqrt{1-\frac{1}{y^2}} - \frac{\sqrt{1-x^2}}{y} \right) -$$

$$\pi \left( \frac{\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}}{\sqrt{\left( \frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} \right)^2}} + 1 \right) \left[ \frac{\arg \left( i x + \sqrt{1-x^2} \right) + \arg \left( \sqrt{1-\frac{1}{y^2}} - \frac{i}{y} \right) - \pi}{2 \pi} \right]$$

01.12.16.0132.01

$$\sin^{-1}(x) + \sec^{-1}(y) = \sin^{-1} \left( (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}\right)}{\pi} \right\rfloor} \left[ x \sqrt{1 - \frac{1}{y^2}} - \frac{\sqrt{1-x^2}}{y} \right] \right) -$$

$$\frac{1}{2} \pi \left( 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}\right)}{\pi} \right\rfloor} \left[ \frac{\arg\left(i x + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1 - \frac{1}{y^2}} - \frac{i}{y}\right)}{2 \pi} \right] + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}\right)}{\pi} \right\rfloor} \right) \right)$$

$$2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}\right)}{\pi} \right\rfloor} \left[ \frac{1}{2} - \frac{\arg\left(i x + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1 - \frac{1}{y^2}} - \frac{i}{y}\right)}{2 \pi} \right] \right)$$

### Involving $\sinh^{-1}(z)$

01.12.16.0133.01

$$\sin^{-1}(x) + \sinh^{-1}(y) = \log \left( \left( i x + \sqrt{1-x^2} \right)^{-i} \left( y + \sqrt{y^2+1} \right) \right) -$$

$$2 i \pi \left( \left[ \frac{-\arg\left(y + \sqrt{y^2+1}\right) - \arg\left(\left( i x + \sqrt{1-x^2} \right)^{-i}\right) + \pi}{2 \pi} \right] + \left[ \frac{\operatorname{Re}\left(\log\left(i x + \sqrt{1-x^2}\right)\right) + \pi}{2 \pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(y + \sqrt{y^2+1}\right)\right)}{2 \pi} \right] \right)$$

01.12.16.0134.01

$$\begin{aligned} \sin^{-1}(x) + \sinh^{-1}(y) = & i\pi \left[ 1 - (-1)^{\left\lfloor \frac{\arg\left(\frac{(y+\sqrt{y^2+1})(ix+\sqrt{1-x^2})^{-i}+1}{2\pi}\right)}{2\pi} \right\rfloor - \left\lfloor \frac{\arg\left(\frac{(ix+\sqrt{1-x^2})^{-i}(y+\sqrt{y^2+1})}{2\pi}\right)}{2\pi} \right\rfloor \right] + \\ & i(-1)^{\left\lfloor \frac{\arg\left(\frac{(ix+\sqrt{1-x^2})^{-i}(y+\sqrt{y^2+1})-1}{2\pi}\right) + \frac{1}{2} - \arg\left(\frac{(y+\sqrt{y^2+1})(ix+\sqrt{1-x^2})^{-i}+1}{2\pi}\right)}{2\pi} \right\rfloor + \left\lfloor \frac{\arg\left(\frac{(ix+\sqrt{1-x^2})^{-i}(y+\sqrt{y^2+1})}{\pi}\right)}{\pi} \right\rfloor} \\ & \left( \sin^{-1} \left( \frac{\left( (ix + \sqrt{1-x^2})^i \left( (y + \sqrt{y^2+1})^2 (ix + \sqrt{1-x^2})^{-2i} + 1 \right) \right)}{2(y + \sqrt{y^2+1})} \right) - \frac{\pi}{2} \right) - \\ & 2i\pi \left[ \frac{-\arg(y + \sqrt{y^2+1}) - \arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{2\pi}\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(\log(ix + \sqrt{1-x^2})\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log(y + \sqrt{y^2+1})\right)}{2\pi} \right] \end{aligned}$$

01.12.16.0135.01

$$\begin{aligned} \sin^{-1}(x) + i \sinh^{-1}(y) = & \frac{1}{2} \pi \left[ 1 - \frac{\sqrt{1-x^2} \sqrt{y^2+1} - ixy}{\sqrt{(\sqrt{1-x^2} \sqrt{y^2+1} - ixy)^2}} \right] + \\ & \pi \left[ \frac{\arg(ix + \sqrt{1-x^2}) + \arg(\sqrt{y^2+1} - y)}{2\pi} \right] \left[ 1 - \frac{\sqrt{1-x^2} \sqrt{y^2+1} - ixy}{\sqrt{(\sqrt{1-x^2} \sqrt{y^2+1} - ixy)^2}} \right] + \\ & \frac{(i(\sqrt{1-x^2} \sqrt{y^2+1} - ixy)) \sinh^{-1}(\sqrt{1-x^2} y - ix \sqrt{y^2+1})}{\sqrt{(\sqrt{1-x^2} \sqrt{y^2+1} - ixy)^2}} - \\ & \pi \left[ \frac{\sqrt{1-x^2} \sqrt{y^2+1} - ixy}{\sqrt{(\sqrt{1-x^2} \sqrt{y^2+1} - ixy)^2}} + 1 \right] \left[ \frac{-\arg(ix + \sqrt{1-x^2}) - \arg(\sqrt{y^2+1} - y) + \pi}{2\pi} \right] \end{aligned}$$

01.12.16.0136.01

$$\sin^{-1}(x) + i \sinh^{-1}(y) = \sin^{-1} \left( (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} \sqrt{y^2+1} - ixy)}{\pi} \right\rfloor} \left( \sqrt{y^2+1} x + i \sqrt{1-x^2} y \right) \right) -$$

$$\frac{1}{2} \pi \left( 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} \sqrt{y^2+1} - ixy)}{\pi} \right\rfloor} \right) \left\lfloor \frac{\arg(i x + \sqrt{1-x^2}) + \arg(\sqrt{y^2+1} - y)}{2\pi} \right\rfloor + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} \sqrt{y^2+1} - ixy)}{\pi} \right\rfloor} \right) +$$

$$2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} \sqrt{y^2+1} - ixy)}{\pi} \right\rfloor} \right) \left\lfloor \frac{1}{2} - \frac{\arg(i x + \sqrt{1-x^2}) + \arg(\sqrt{y^2+1} - y)}{2\pi} \right\rfloor - 1 \right)$$

### Involving $\cosh^{-1}(z)$

01.12.16.0137.01

$$\sin^{-1}(x) + \cosh^{-1}(y) =$$

$$\log \left( (i x + \sqrt{1-x^2})^{-i} (y + \sqrt{y-1} \sqrt{y+1}) \right) - 2 i \pi \left( \frac{-\arg(y + \sqrt{y-1} \sqrt{y+1}) - \arg \left( (i x + \sqrt{1-x^2})^{-i} \right) + \pi}{2\pi} \right) +$$

$$\left( \frac{\operatorname{Re} \left( \log \left( i x + \sqrt{1-x^2} \right) \right) + \pi}{2\pi} \right) + \left( \frac{\pi - \operatorname{Im} \left( \log \left( y + \sqrt{y-1} \sqrt{y+1} \right) \right)}{2\pi} \right)$$



01.12.16.0138.01

$$\sin^{-1}(x) + \cosh^{-1}(y) = i\pi \left( 1 - (-1) \left[ \left| \frac{\arg\left(\left(y + \sqrt{y-1}\sqrt{y+1}\right)\left(ix + \sqrt{1-x^2}\right)^{-i} + 1\right)}{2\pi} \right| \left| \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i}\left(y + \sqrt{y-1}\sqrt{y+1}\right)\right)}{2\pi} \right| \right] + \right. \\ \left. i(-1) \left[ \left| \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i}\left(y + \sqrt{y-1}\sqrt{y+1}\right) - 1\right)}{2\pi} + \frac{1}{2} \frac{\arg\left(\left(y + \sqrt{y-1}\sqrt{y+1}\right)\left(ix + \sqrt{1-x^2}\right)^{-i} + 1\right)}{2\pi} \right| \left| \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i}\left(y + \sqrt{y-1}\sqrt{y+1}\right)\right)}{\pi} \right| \right] \right. \\ \left. \left( \sin^{-1} \left( \frac{\left(\left(ix + \sqrt{1-x^2}\right)^i\left(y + \sqrt{y-1}\sqrt{y+1}\right)^2\left(ix + \sqrt{1-x^2}\right)^{-2i} + 1\right)}{2\left(y + \sqrt{y-1}\sqrt{y+1}\right)} \right) - \frac{\pi}{2} \right) - \right. \\ \left. 2i\pi \left[ \frac{-\arg\left(y + \sqrt{y-1}\sqrt{y+1}\right) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i}\right) + \pi}{2\pi} \right] + \right. \\ \left. \left[ \frac{\operatorname{Re}\left(\log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(y + \sqrt{y-1}\sqrt{y+1}\right)\right)}{2\pi} \right] \right)$$

01.12.16.0139.01

$$\begin{aligned} \sin^{-1}(x) + i \cosh^{-1}(y) &= \sin^{-1} \left( (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(xy + i\sqrt{1-x^2}\sqrt{y-1}\sqrt{y+1})}{\pi} \right\rfloor} \left( ix\sqrt{y-1}\sqrt{y+1} - \sqrt{1-x^2}y \right) \right) + \\ &\frac{1}{2} \pi \left( \frac{1}{2} \left( 1 - (-1)^{\left\lfloor -\frac{\arg(1-y)}{2\pi} \right\rfloor} \right) \right) \left( 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(xy + \sqrt{1-x^2}\sqrt{1-y^2})}{\pi} \right\rfloor} \right) \right) \left( \frac{\arg(\sqrt{1-x^2} - ix) + \arg(iy + \sqrt{1-y^2})}{2\pi} \right) + \\ &(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(xy + \sqrt{1-x^2}\sqrt{1-y^2})}{\pi} \right\rfloor} + 2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(xy + \sqrt{1-x^2}\sqrt{1-y^2})}{\pi} \right\rfloor} \right) \left( \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} - ix) + \arg(iy + \sqrt{1-y^2})}{2\pi} \right) \Bigg) - \\ &\frac{1}{2} \left( 1 + (-1)^{\left\lfloor -\frac{\arg(1-y)}{2\pi} \right\rfloor} \right) \left( 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2}\sqrt{1-y^2} - xy)}{\pi} \right\rfloor} \right) \right) \left( \frac{\arg(ix + \sqrt{1-x^2}) + \arg(iy + \sqrt{1-y^2})}{2\pi} \right) + \\ &(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2}\sqrt{1-y^2} - xy)}{\pi} \right\rfloor} + 2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2}\sqrt{1-y^2} - xy)}{\pi} \right\rfloor} \right) \left( \frac{1}{2} - \frac{\arg(ix + \sqrt{1-x^2}) + \arg(iy + \sqrt{1-y^2})}{2\pi} \right) \Bigg) \Bigg) \end{aligned}$$

Involving  $\tanh^{-1}(z)$

01.12.16.0140.01

$$\sin^{-1}(x) + \tanh^{-1}(y) =$$

$$-2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i}\right) + \frac{1}{2}\arg(1-y) + \pi}{2\pi} \right] + \left[ \frac{\frac{1}{2}\operatorname{Im}(\log(1-y)) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(\log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] \right)$$

$$2i\pi \left( \left[ \frac{-\frac{1}{2}\arg(y+1) - \arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{1-y}}\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \frac{1}{2}\operatorname{Im}(\log(y+1))}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{1-y}}\right)\right)}{2\pi} \right] \right) +$$

$$\log\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{y+1}}{\sqrt{1-y}}\right)$$

01.12.16.0141.01

$$\sin^{-1}(x) + \tanh^{-1}(y) =$$

$$-2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i}\right) + \frac{1}{2}\arg(1-y) + \pi}{2\pi} \right] + \left[ \frac{\frac{1}{2}\operatorname{Im}(\log(1-y)) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(\log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] \right)$$

$$2i\pi \left( \left[ \frac{-\frac{1}{2}\arg(y+1) - \arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{1-y}}\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \frac{1}{2}\operatorname{Im}(\log(y+1))}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{1-y}}\right)\right)}{2\pi} \right] \right) +$$

$$i\pi \left( 1 - (-1)^{\left( \left[ \frac{\arg\left(\frac{\sqrt{y+1}\left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{1-y}}\right) + 1}{2\pi} \right] - \left[ \frac{\arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i}\sqrt{y+1}}{\sqrt{1-y}}\right)}{2\pi} \right] \right)} \right) +$$

$$i(-1)^{\left( \left[ \frac{\arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i}\sqrt{y+1}}{\sqrt{1-y}}\right) - 1}{2\pi} \right] + \frac{1}{2} - \left[ \frac{\arg\left(\frac{\sqrt{y+1}\left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{1-y}}\right) + 1}{2\pi} \right] \right) - \left[ \frac{\arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i}\sqrt{y+1}}{\sqrt{1-y}}\right)}{\pi} \right] \right)}$$

$$\left( \sin^{-1} \left( \frac{\left(ix + \sqrt{1-x^2}\right)^i \sqrt{1-y} \left( \frac{(y+1)\left(ix + \sqrt{1-x^2}\right)^{-2i}}{1-y} + 1 \right)}{2\sqrt{y+1}} \right) - \frac{\pi}{2} \right)$$

01.12.16.0142.01

$$\sin^{-1}(x) + i \tanh^{-1}(y) = \frac{1}{2 \sqrt{\frac{(x+i\sqrt{1-x^2}y)^2}{1-y^2}} \sqrt{1-y^2}} \left( (x+i\sqrt{1-x^2}y) \left( \pi - 2 \sin^{-1} \left( \frac{\sqrt{1-x^2} - ixy}{\sqrt{1-y^2}} \right) \right) \right) +$$

$$2\pi \left( x+i\sqrt{1-x^2}y + \sqrt{\frac{y^2x^2+x^2+2i\sqrt{1-x^2}yx-y^2}{1-y^2}} \sqrt{1-y^2} \right) \left[ \frac{\arg(i x + \sqrt{1-x^2}) + \arg\left(\frac{i-iy}{\sqrt{1-y^2}}\right)}{2\pi} \right] -$$

$$2\pi \left( -x-i\sqrt{1-x^2}y + \sqrt{\frac{y^2x^2+x^2+2i\sqrt{1-x^2}yx-y^2}{1-y^2}} \sqrt{1-y^2} \right) \left[ \frac{\arg(i x + \sqrt{1-x^2}) + \arg\left(\frac{i-iy}{\sqrt{1-y^2}}\right) - \pi}{2\pi} \right]$$

01.12.16.0143.01

$$\sin^{-1}(x) + i \tanh^{-1}(y) =$$

$$\sin^{-1} \left( \frac{(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x+i\sqrt{1-x^2}y}{\sqrt{1-y^2}}\right)}{\pi} \right\rfloor} (ixy - \sqrt{1-x^2})}{\sqrt{1-y^2}} \right) + \frac{1}{2} \pi \left( 2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x+i\sqrt{1-x^2}y}{\sqrt{1-y^2}}\right)}{\pi} \right\rfloor} \right) \left[ \frac{\arg(i x + \sqrt{1-x^2}) + \arg\left(\frac{i-iy}{\sqrt{1-y^2}}\right)}{2\pi} \right] \right) +$$

$$(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x+i\sqrt{1-x^2}y}{\sqrt{1-y^2}}\right)}{\pi} \right\rfloor} - 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x+i\sqrt{1-x^2}y}{\sqrt{1-y^2}}\right)}{\pi} \right\rfloor} \right) \left[ \frac{1}{2} - \frac{\arg(i x + \sqrt{1-x^2}) + \arg\left(\frac{i-iy}{\sqrt{1-y^2}}\right)}{2\pi} \right]$$

Involving  $\coth^{-1}(z)$

01.12.16.0144.01

$$\sin^{-1}(x) + \coth^{-1}(y) =$$

$$-2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i}\right) + \frac{1}{2}\arg\left(1 - \frac{1}{y}\right) + \pi}{2\pi} \right] + \left[ \frac{\frac{1}{2}\operatorname{Im}\left(\log\left(1 - \frac{1}{y}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(\log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] \right)$$

$$+ 2i\pi \left( \left[ \frac{-\frac{1}{2}\arg\left(1 + \frac{1}{y}\right) - \arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{1-\frac{1}{y}}}\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \frac{1}{2}\operatorname{Im}\left(\log\left(1 + \frac{1}{y}\right)\right)}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{1-\frac{1}{y}}}\right)\right)}{2\pi} \right] \right)$$

$$+ \log\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1 + \frac{1}{y}}}{\sqrt{1 - \frac{1}{y}}}\right)$$

01.12.16.0145.01

$$\sin^{-1}(x) + \coth^{-1}(y) =$$

$$-2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i}\right) + \frac{1}{2}\arg\left(1 - \frac{1}{y}\right) + \pi}{2\pi} \right] + \left[ \frac{\frac{1}{2}\operatorname{Im}\left(\log\left(1 - \frac{1}{y}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(\log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] \right) -$$

$$2i\pi \left( \left[ \frac{-\frac{1}{2}\arg\left(1 + \frac{1}{y}\right) - \arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{1-\frac{1}{y}}}\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \frac{1}{2}\operatorname{Im}\left(\log\left(1 + \frac{1}{y}\right)\right)}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{1-\frac{1}{y}}}\right)\right)}{2\pi} \right] \right) +$$

$$i\pi \left( 1 - (-1)^{\left\lfloor \frac{\arg\left(\frac{\sqrt{1+\frac{1}{y}}\left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{1-\frac{1}{y}}}\right) + 1}{2\pi} \right\rfloor} \left\lfloor \frac{\arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i}\sqrt{1+\frac{1}{y}}}{\sqrt{1-\frac{1}{y}}}\right)}{2\pi} \right\rfloor \right) +$$

$$i(-1)^{\left\lfloor \frac{\arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i}\sqrt{1+\frac{1}{y}}}{\sqrt{1-\frac{1}{y}}}\right) - 1}{2\pi} \right\rfloor} \left\lfloor \frac{\arg\left(\frac{\sqrt{1+\frac{1}{y}}\left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{1-\frac{1}{y}}}\right) + 1}{2\pi} \right\rfloor \right) + \left\lfloor \frac{\arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i}\sqrt{1+\frac{1}{y}}}{\sqrt{1-\frac{1}{y}}}\right)}{\pi} \right\rfloor$$

$$\left( \sin^{-1} \left( \frac{\left(ix + \sqrt{1-x^2}\right)^i \left( \frac{\left(1+\frac{1}{y}\right)\left(ix + \sqrt{1-x^2}\right)^{-2i}}{1-\frac{1}{y}} + 1 \right) \sqrt{1-\frac{1}{y}}}{2\sqrt{1+\frac{1}{y}}} \right) - \frac{\pi}{2} \right)$$

01.12.16.0146.01

$$\sin^{-1}(x) + i \operatorname{coth}^{-1}(y) = \frac{1}{2 \sqrt{1 - \frac{1}{y^2}} y \sqrt{\frac{(\sqrt{1-x^2} - ixy)^2}{1-y^2}}}$$

$$\left( i \left( \sqrt{1-x^2} - ixy \right) \left( \pi - 2 \sin^{-1} \left( \frac{\sqrt{1-x^2} - \frac{ix}{y}}{\sqrt{1-\frac{1}{y^2}}} \right) \right) + 2\pi \left( -ixy - i \sqrt{1-\frac{1}{y^2}} \sqrt{\frac{(-y^2-1)x^2 - 2i\sqrt{1-x^2}yx + 1}{1-y^2}} \right) y + \right.$$

$$\left. \sqrt{1-x^2} \right) \left[ \frac{\arg(ix + \sqrt{1-x^2}) + \arg\left(\frac{i-\frac{i}{y}}{\sqrt{1-\frac{1}{y^2}}}\right)}{2\pi} \right] + 2\pi \left( -ixy + \right.$$

$$\left. i \sqrt{\frac{(-y^2-1)x^2 - 2i\sqrt{1-x^2}yx + 1}{1-y^2}} \sqrt{1-\frac{1}{y^2}} y + \sqrt{1-x^2} \right) \left[ \frac{\arg(ix + \sqrt{1-x^2}) + \arg\left(\frac{i-\frac{i}{y}}{\sqrt{1-\frac{1}{y^2}}}\right) - \pi}{2\pi} \right] \right)$$



01.12.16.0147.01

$$\sin^{-1}(x) + i \operatorname{coth}^{-1}(y) =$$

$$\sin^{-1} \left( \frac{(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x + \sqrt{1-x^2}}{y} \right)}{\pi} \right\rfloor} \left( \frac{ix}{y} - \sqrt{1-x^2} \right)}{\sqrt{1 - \frac{1}{y^2}}} \right) + \frac{1}{2} \pi \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x + \sqrt{1-x^2}}{y} \right)}{\pi} \right\rfloor} \right) \frac{\arg \left( ix + \sqrt{1-x^2} \right) + \arg \left( \frac{i - \frac{i}{y}}{\sqrt{1 - \frac{1}{y^2}}} \right)}{2\pi} +$$

$$(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x + \sqrt{1-x^2}}{y} \right)}{\pi} \right\rfloor} - 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x + \sqrt{1-x^2}}{y} \right)}{\pi} \right\rfloor} \right) \frac{1}{2} \frac{\arg \left( ix + \sqrt{1-x^2} \right) + \arg \left( \frac{i - \frac{i}{y}}{\sqrt{1 - \frac{1}{y^2}}} \right)}{2\pi}$$

### Involving $\operatorname{csch}^{-1}(z)$

01.12.16.0148.01

$$\sin^{-1}(x) + \operatorname{csch}^{-1}(y) = \log \left( \left( ix + \sqrt{1-x^2} \right)^{-i} \left( \sqrt{1 + \frac{1}{y^2}} + \frac{1}{y} \right) \right) - 2i\pi$$

$$\left( \frac{-\arg \left( \left( ix + \sqrt{1-x^2} \right)^{-i} \right) - \arg \left( \sqrt{1 + \frac{1}{y^2}} + \frac{1}{y} \right) + \pi}{2\pi} \right) + \left( \frac{\operatorname{Re} \left( \log \left( ix + \sqrt{1-x^2} \right) \right) + \pi}{2\pi} \right) + \left( \frac{\pi - \operatorname{Im} \left( \log \left( \sqrt{1 + \frac{1}{y^2}} + \frac{1}{y} \right) \right)}{2\pi} \right)$$

01.12.16.0149.01

$$\sin^{-1}(x) + \operatorname{csch}^{-1}(y) = i\pi \left( 1 - (-1) \left| \frac{\arg\left(\left(\sqrt{1+\frac{1}{y^2}} + \frac{1}{y}\right)(ix + \sqrt{1-x^2})^{-i} + 1\right)}{2\pi} \right| - \frac{\arg\left((ix + \sqrt{1-x^2})^{-i} \left(\sqrt{1+\frac{1}{y^2}} + \frac{1}{y}\right)\right)}{2\pi} \right) +$$

$$i(-1) \left| \frac{\arg\left((ix + \sqrt{1-x^2})^{-i} \left(\sqrt{1+\frac{1}{y^2}} + \frac{1}{y}\right) - 1\right)}{2\pi} + \frac{1}{2} - \frac{\arg\left(\left(\sqrt{1+\frac{1}{y^2}} + \frac{1}{y}\right)(ix + \sqrt{1-x^2})^{-i} + 1\right)}{2\pi} \right| + \left| \frac{\arg\left((ix + \sqrt{1-x^2})^{-i} \left(\sqrt{1+\frac{1}{y^2}} + \frac{1}{y}\right)\right)}{\pi} \right|$$

$$\left( \sin^{-1} \left( \frac{\left( (ix + \sqrt{1-x^2})^i \left( \left( \sqrt{1+\frac{1}{y^2}} + \frac{1}{y} \right)^2 (ix + \sqrt{1-x^2})^{-2i} + 1 \right) \right)}{2 \left( \sqrt{1+\frac{1}{y^2}} + \frac{1}{y} \right)} \right) - \frac{\pi}{2} - 2i\pi \right)$$

$$\left( \frac{-\arg\left((ix + \sqrt{1-x^2})^{-i}\right) - \arg\left(\sqrt{1+\frac{1}{y^2}} + \frac{1}{y}\right) + \pi}{2\pi} \right) + \left( \frac{\operatorname{Re}\left(\log(ix + \sqrt{1-x^2})\right) + \pi}{2\pi} \right) + \left( \frac{\pi - \operatorname{Im}\left(\log\left(\sqrt{1+\frac{1}{y^2}} + \frac{1}{y}\right)\right)}{2\pi} \right)$$

01.12.16.0150.01

$$\sin^{-1}(x) + i \operatorname{csch}^{-1}(y) = \frac{\sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}} - \frac{ix}{y}}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}} - \frac{ix}{y}\right)^2}} \sin^{-1}\left(x \sqrt{1+\frac{1}{y^2}} + \frac{i\sqrt{1-x^2}}{y}\right) +$$

$$\pi \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1+\frac{1}{y^2}} - \frac{1}{y}\right)}{2\pi} \right] \left[ \frac{i\left(x + i\sqrt{1-x^2} y \sqrt{1+\frac{1}{y^2}}\right)}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}} - \frac{ix}{y}\right)^2} y} + 1 \right] +$$

$$\frac{1}{2} \pi \left[ \frac{i\left(x + i\sqrt{1-x^2} y \sqrt{1+\frac{1}{y^2}}\right)}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}} - \frac{ix}{y}\right)^2} y} + 1 \right] -$$

$$\pi \left[ \frac{\sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}} - \frac{ix}{y}}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}} - \frac{ix}{y}\right)^2}} + 1 \right] \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1+\frac{1}{y^2}} - \frac{1}{y}\right) - \pi}{2\pi} \right]$$

01.12.16.0151.01

$$\sin^{-1}(x) + i \operatorname{csch}^{-1}(y) = \sin^{-1} \left( (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\sqrt{1-x^2} \sqrt{1+\frac{1}{y^2} - \frac{ix}{y}}\right)}{\pi} \right\rfloor} \left[ x \sqrt{1+\frac{1}{y^2}} + \frac{i \sqrt{1-x^2}}{y} \right] \right) -$$

$$\frac{1}{2} \pi \left( 2 \left( (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\sqrt{1-x^2} \sqrt{1+\frac{1}{y^2} - \frac{ix}{y}}\right)}{\pi} \right\rfloor} \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1+\frac{1}{y^2} - \frac{1}{y}}\right)}{2\pi} \right] + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\sqrt{1-x^2} \sqrt{1+\frac{1}{y^2} - \frac{ix}{y}}\right)}{\pi} \right\rfloor} \right) +$$

$$2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\sqrt{1-x^2} \sqrt{1+\frac{1}{y^2} - \frac{ix}{y}}\right)}{\pi} \right\rfloor} \left[ \frac{1}{2} - \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1+\frac{1}{y^2} - \frac{1}{y}}\right)}{2\pi} \right] - 1 \right)$$

### Involving $\operatorname{sech}^{-1}(z)$

01.12.16.0152.01

$\sin^{-1}(x) + \operatorname{sech}^{-1}(y) =$

$$\log \left( (ix + \sqrt{1-x^2})^{-i} \left( \sqrt{\frac{1}{y} - 1} \sqrt{1 + \frac{1}{y} + \frac{1}{y}} \right) \right) - 2i\pi \left( \frac{-\arg\left((ix + \sqrt{1-x^2})^{-i}\right) - \arg\left(\sqrt{\frac{1}{y} - 1} \sqrt{1 + \frac{1}{y} + \frac{1}{y}}\right) + \pi}{2\pi} \right) +$$

$$\left[ \frac{\operatorname{Re}\left(\log(ix + \sqrt{1-x^2})\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\sqrt{\frac{1}{y} - 1} \sqrt{1 + \frac{1}{y} + \frac{1}{y}}\right)\right)}{2\pi} \right]$$

01.12.16.0153.01

$$\sin^{-1}(x) + \operatorname{sech}^{-1}(y) = i\pi \left( 1 - (-1)^{\left| \frac{\arg\left(\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)(ix+\sqrt{1-x^2})^{-i}+1\right)}{2\pi} \right| - \left| \frac{\arg\left((ix+\sqrt{1-x^2})^{-i}\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)\right)}{2\pi} \right| \right) + \right.$$

$$\left. i(-1)^{\left| \frac{\arg\left((ix+\sqrt{1-x^2})^{-i}\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)-1\right)}{2\pi} + \frac{1}{2} - \frac{\arg\left(\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)(ix+\sqrt{1-x^2})^{-i}+1\right)}{2\pi} \right| + \left| \frac{\arg\left((ix+\sqrt{1-x^2})^{-i}\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)\right)}{\pi} \right| \right)} \right.$$

$$\left( \sin^{-1} \left( \frac{\left( (ix+\sqrt{1-x^2})^i \left( \left( \sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}} \right)^2 (ix+\sqrt{1-x^2})^{-2i} + 1 \right) \right)}{2 \left( \sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}} \right)} \right) - \frac{\pi}{2} \right) - \right.$$

$$2i\pi \left( \frac{-\arg\left((ix+\sqrt{1-x^2})^{-i}\right) - \arg\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right) + \pi}{2\pi} \right) + \left.$$

$$\left( \frac{\operatorname{Re}\left(\log\left(ix+\sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right) + \left( \frac{\pi - \operatorname{Im}\left(\log\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)\right)}{2\pi} \right) \right)$$

01.12.16.0154.01

$$\sin^{-1}(x) + i \operatorname{sech}^{-1}(y) = \sin^{-1} \left( (-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(i\sqrt{1-x^2} \sqrt{\frac{1}{y}-1} \sqrt{1+\frac{1}{y}+\frac{x}{y}}\right)}{\pi} \rfloor} \left( ix \sqrt{\frac{1}{y}-1} \sqrt{1+\frac{1}{y}} - \frac{\sqrt{1-x^2}}{y} \right) \right) +$$

$$\frac{1}{2} \pi \left( \frac{1}{2} \left( 1 - (-1)^{\lfloor \frac{\arg\left(\frac{1-\frac{1}{y}}{2\pi}\right)}{2\pi} \rfloor} \right) \left( \left( (-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x+\sqrt{1-x^2}}{y} \sqrt{1-\frac{1}{y^2}}\right)}{\pi} \rfloor} \right) \left( \frac{\arg\left(\sqrt{1-x^2} - ix\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)}{2\pi} \right) \right) +$$

$$(-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x+\sqrt{1-x^2}}{y} \sqrt{1-\frac{1}{y^2}}\right)}{\pi} \rfloor} + 2 \left( (-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x+\sqrt{1-x^2}}{y} \sqrt{1-\frac{1}{y^2}}\right)}{\pi} \rfloor} \right) \left( \frac{1}{2} - \frac{\arg\left(\sqrt{1-x^2} - ix\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)}{2\pi} \right) \right) -$$

$$\frac{1}{2} \left( 1 + (-1)^{\lfloor \frac{\arg\left(\frac{1-\frac{1}{y}}{2\pi}\right)}{2\pi} \rfloor} \right) \left( \left( (-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} - \frac{x}{y}\right)}{\pi} \rfloor} \right) \left( \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)}{2\pi} \right) \right) +$$

$$(-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} - \frac{x}{y}\right)}{\pi} \rfloor} + 2 \left( (-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} - \frac{x}{y}\right)}{\pi} \rfloor} \right) \left( \frac{1}{2} - \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)}{2\pi} \right) \right)$$

**Differences involving the direct function**

**Involving log(z)**

01.12.16.0155.01

$$\sin^{-1}(x) - \log(y) = \log \left( \frac{\left( i x + \sqrt{1-x^2} \right)^{-i}}{y} \right) -$$

$$2 i \pi \left( \left[ \frac{-\arg \left( \left( i x + \sqrt{1-x^2} \right)^{-i} \right) - \arg \left( \frac{1}{y} \right) + \pi}{2 \pi} \right] + \left[ \frac{\operatorname{Im}(\log(y)) + \pi}{2 \pi} \right] + \left[ \frac{\operatorname{Re} \left( \log \left( i x + \sqrt{1-x^2} \right) \right) + \pi}{2 \pi} \right] \right)$$

01.12.16.0156.01

$$\sin^{-1}(x) - \log(y) = i \pi \left( 1 - (-1)^{\left\lfloor \frac{\arg \left( \frac{\left( i x + \sqrt{1-x^2} \right)^{-i}}{y} \right) + 1}{2 \pi} \right\rfloor - \left\lfloor \frac{\arg \left( \frac{\left( i x + \sqrt{1-x^2} \right)^{-i}}{y} \right)}{2 \pi} \right\rfloor \right) +$$

$$i (-1)^{\left\lfloor \frac{\arg \left( \frac{\left( i x + \sqrt{1-x^2} \right)^{-i}}{y} \right) - 1}{2 \pi} \right\rfloor + \frac{1}{2} - \left\lfloor \frac{\arg \left( \frac{\left( i x + \sqrt{1-x^2} \right)^{-i}}{y} \right) + 1}{2 \pi} \right\rfloor + \left\lfloor \frac{\arg \left( \frac{\left( i x + \sqrt{1-x^2} \right)^{-i}}{y} \right)}{\pi} \right\rfloor \right) \left( \sin^{-1} \left( \frac{1}{2} \left( i x + \sqrt{1-x^2} \right) i \left( \frac{\left( i x + \sqrt{1-x^2} \right)^{-2i}}{y^2} + 1 \right) y \right) - \frac{\pi}{2} \right) -$$

$$2 i \pi \left( \left[ \frac{-\arg \left( \left( i x + \sqrt{1-x^2} \right)^{-i} \right) - \arg \left( \frac{1}{y} \right) + \pi}{2 \pi} \right] + \left[ \frac{\operatorname{Im}(\log(y)) + \pi}{2 \pi} \right] + \left[ \frac{\operatorname{Re} \left( \log \left( i x + \sqrt{1-x^2} \right) \right) + \pi}{2 \pi} \right] \right)$$

### Involving $\cos^{-1}(z)$

01.12.16.0040.01

$$\sin^{-1}(x) - \cos^{-1}(y) = \pi \left( \operatorname{sgn}(x+y) - \frac{1}{2} \right) - \operatorname{sgn}(x+y) \cos^{-1} \left( x y - \sqrt{1-x^2} \sqrt{1-y^2} \right); -1 < x < 1 \vee -1 < y < 1 \vee x y > 0$$

01.12.16.0041.01

$$\sin^{-1}(x) - \cos^{-1}(y) = \operatorname{sgn}(x+y) \cos^{-1} \left( x y - \sqrt{1-x^2} \sqrt{1-y^2} \right) - \pi \left( \operatorname{sgn}(x+y) + \frac{1}{2} \right); x < -1 \wedge y > 1 \vee x > 1 \wedge y < -1$$

01.12.16.0157.01

$$\sin^{-1}(x) - \cos^{-1}(y) = \operatorname{sgn}(x+y) \cos^{-1} \left( \sqrt{1-x^2} \sqrt{1-y^2} - x y \right) - \frac{\pi}{2}; x > -1 \wedge y > -1 \vee x < 1 \wedge y < 1$$

01.12.16.0158.01

$$\sin^{-1}(x) - \cos^{-1}(y) = -\operatorname{sgn}(x+y) \cos^{-1}\left(\sqrt{1-x^2} \sqrt{1-y^2} - xy\right) - \frac{\pi}{2}; x > 1 \wedge y < -1 \vee x < -1 \wedge y > 1$$

01.12.16.0159.01

$$\sin^{-1}(x) - \cos^{-1}(y) = \sin^{-1}\left(y \sqrt{1-x^2} + x \sqrt{1-y^2}\right) - \frac{\pi}{2}; xy \leq 0 \vee x^2 + y^2 \leq 1$$

01.12.16.0160.01

$$\sin^{-1}(x) - \cos^{-1}(y) = \operatorname{sgn}(x) \pi - \sin^{-1}\left(y \sqrt{1-x^2} + x \sqrt{1-y^2}\right) - \frac{\pi}{2}; xy > 0 \wedge x^2 + y^2 > 1$$

01.12.16.0161.01

$$\sin^{-1}(x) - \cos^{-1}(y) = \tan^{-1}\left(\frac{y \sqrt{1-x^2} + x \sqrt{1-y^2}}{\sqrt{1-y^2} \sqrt{1-x^2} - xy}\right) - \frac{\pi}{2}; xy < 0 \vee x^2 + y^2 \leq 1$$

01.12.16.0162.01

$$\sin^{-1}(x) - \cos^{-1}(y) = \tan^{-1}\left(\frac{y \sqrt{1-x^2} + x \sqrt{1-y^2}}{\sqrt{1-y^2} \sqrt{1-x^2} - xy}\right) + \pi \operatorname{sgn}(x) - \frac{\pi}{2}; xy > 0 \wedge x^2 + y^2 > 1$$

01.12.16.0163.01

$$\sin^{-1}(x) - \cos^{-1}(y) = \frac{\sqrt{1-x^2} \sqrt{1-y^2} - xy}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1-y^2} - xy\right)^2}} \sin^{-1}\left(x \sqrt{1-y^2} + y \sqrt{1-x^2}\right) - \frac{\pi}{2} \frac{\sqrt{1-x^2} \sqrt{1-y^2} - xy}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1-y^2} - xy\right)^2}} +$$

$$\pi \left( 1 - \frac{\sqrt{1-x^2} \sqrt{1-y^2} - xy}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1-y^2} - xy\right)^2}} \right) \left| \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(iy + \sqrt{1-y^2}\right)}{2\pi} \right| -$$

$$\pi \left( 1 + \frac{\sqrt{1-x^2} \sqrt{1-y^2} - xy}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1-y^2} - xy\right)^2}} \right) \left| \frac{\pi - \arg\left(ix + \sqrt{1-x^2}\right) - \arg\left(iy + \sqrt{1-y^2}\right)}{2\pi} \right|$$



01.12.16.0164.01

$$\sin^{-1}(x) - \cos^{-1}(y) = -\sin^{-1} \left( (-1)^{\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} \sqrt{1-y^2} - xy)}{\pi} \rfloor} \left( -\sqrt{1-y^2} x - \sqrt{1-x^2} y \right) \right) +$$

$$\frac{1}{2} \pi \left( 2 \left( -1 + (-1)^{\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} \sqrt{1-y^2} - xy)}{\pi} \rfloor} \right) \left[ \frac{\arg(\sqrt{1-x^2} - ix) + \arg(\sqrt{1-y^2} - iy)}{2\pi} \right] + (-1)^{\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} \sqrt{1-y^2} - xy)}{\pi} \rfloor} \right) +$$

$$2 \left( 1 + (-1)^{\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} \sqrt{1-y^2} - xy)}{\pi} \rfloor} \right) \left[ \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} - ix) + \arg(\sqrt{1-y^2} - iy)}{2\pi} \right] - 2 \right)$$

### Involving $\tan^{-1}(z)$

01.12.16.0165.01

$$\sin^{-1}(x) - \tan^{-1}(y) = \frac{1}{2 \sqrt{\frac{(x - \sqrt{1-x^2})^2}{y^2+1}} \sqrt{y^2+1}} \left( (x - \sqrt{1-x^2}) y \left( \pi - 2 \sin^{-1} \left( \frac{xy + \sqrt{1-x^2}}{\sqrt{y^2+1}} \right) \right) + \right.$$

$$2\pi \left( x - \sqrt{1-x^2} y + \sqrt{\frac{-y^2 x^2 + x^2 - 2\sqrt{1-x^2} yx + y^2}{y^2+1}} \sqrt{y^2+1} \right) \left[ \frac{\arg(ix + \sqrt{1-x^2}) + \arg\left(\frac{i+y}{\sqrt{y^2+1}}\right)}{2\pi} \right] -$$

$$2\pi \left( -x + \sqrt{1-x^2} y + \sqrt{\frac{-y^2 x^2 + x^2 - 2\sqrt{1-x^2} yx + y^2}{y^2+1}} \sqrt{y^2+1} \right) \left[ \frac{\arg(ix + \sqrt{1-x^2}) + \arg\left(\frac{i+y}{\sqrt{y^2+1}}\right) - \pi}{2\pi} \right] \right)$$

01.12.16.0166.01

$$\sin^{-1}(x) - \tan^{-1}(y) =$$

$$\sin^{-1} \left( \frac{(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x - \sqrt{1-x^2} y}{\sqrt{y^2+1}}\right)\right\rfloor} \left(-xy - \sqrt{1-x^2}\right)}{\sqrt{y^2+1}} \right) + \frac{1}{2} \pi \left( 2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x - \sqrt{1-x^2} y}{\sqrt{y^2+1}}\right)\right\rfloor} \right) \left[ \frac{\arg\left(i x + \sqrt{1-x^2}\right) + \arg\left(\frac{i+y}{\sqrt{y^2+1}}\right)}{2\pi} \right] \right) +$$

$$(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x - \sqrt{1-x^2} y}{\sqrt{y^2+1}}\right)\right\rfloor} - 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x - \sqrt{1-x^2} y}{\sqrt{y^2+1}}\right)\right\rfloor} \right) \left[ \frac{1}{2} - \frac{\arg\left(i x + \sqrt{1-x^2}\right) + \arg\left(\frac{i+y}{\sqrt{y^2+1}}\right)}{2\pi} \right]$$

Involving  $\cot^{-1}(z)$

01.12.16.0167.01

$$\sin^{-1}(x) - \cot^{-1}(y) = \left[ -\left(\sqrt{1-x^2} - xy\right) \left( \pi - 2 \sin^{-1} \left( \frac{\frac{x}{y} + \sqrt{1-x^2}}{\sqrt{1+\frac{1}{y^2}}} \right) \right) \right] +$$

$$2\pi \left( xy + \sqrt{\frac{(y^2-1)x^2 - 2\sqrt{1-x^2}yx + 1}{y^2+1}} \sqrt{1+\frac{1}{y^2}} y - \sqrt{1-x^2} \right) \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\frac{i+\frac{1}{y}}{\sqrt{1+\frac{1}{y^2}}}\right)}{2\pi} \right] -$$

$$2\pi \left( -xy + \sqrt{\frac{(y^2-1)x^2 - 2\sqrt{1-x^2}yx + 1}{y^2+1}} \sqrt{1+\frac{1}{y^2}} y + \sqrt{1-x^2} \right) \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\frac{i+\frac{1}{y}}{\sqrt{1+\frac{1}{y^2}}}\right) - \pi}{2\pi} \right] \Bigg/$$

$$\left( 2 \sqrt{1+\frac{1}{y^2}} y \sqrt{\frac{(y^2-1)x^2 - 2\sqrt{1-x^2}yx + 1}{y^2+1}} \right)$$

01.12.16.0168.01

$$\sin^{-1}(x) - \cot^{-1}(y) =$$

$$-\sin^{-1} \left( \frac{(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{\sqrt{1-x^2}}{y}\right)}{\pi} \right\rfloor} \left(-\frac{x}{y} - \sqrt{1-x^2}\right)}{\sqrt{1+\frac{1}{y^2}}} \right) - \frac{1}{2} \pi \left( 2 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{\sqrt{1-x^2}}{y}\right)}{\pi} \right\rfloor} \frac{\arg\left(\sqrt{1-x^2} - ix\right) + \arg\left(\frac{i-\frac{1}{y}}{\sqrt{1+\frac{1}{y^2}}}\right)}{2\pi} \right) +$$

$$(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{\sqrt{1-x^2}}{y}\right)}{\pi} \right\rfloor} - 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{\sqrt{1-x^2}}{y}\right)}{\pi} \right\rfloor} \frac{1}{2} - \frac{\arg\left(\sqrt{1-x^2} - ix\right) + \arg\left(\frac{i-\frac{1}{y}}{\sqrt{1+\frac{1}{y^2}}}\right)}{2\pi} \right)$$

Involving  $\csc^{-1}(z)$

01.12.16.0169.01

$$\begin{aligned} \sin^{-1}(x) - \csc^{-1}(y) &= \pi \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} - \frac{i}{y}\right)}{2\pi} \right] \left[ 1 - \frac{x + \sqrt{1-x^2} y \sqrt{1-\frac{1}{y^2}}}{\sqrt{\left(\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}\right)^2} y} \right] + \\ &\frac{1}{2} \pi \left[ 1 - \frac{x + \sqrt{1-x^2} y \sqrt{1-\frac{1}{y^2}}}{\sqrt{\left(\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}\right)^2} y} \right] + \frac{\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}}{\sqrt{\left(\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}\right)^2}} \sin^{-1}\left(x \sqrt{1-\frac{1}{y^2}} - \frac{\sqrt{1-x^2}}{y}\right) - \\ &\pi \left[ \frac{\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}}{\sqrt{\left(\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}\right)^2}} + 1 \right] \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} - \frac{i}{y}\right) - \pi}{2\pi} \right] \end{aligned}$$

01.12.16.0170.01

$$\begin{aligned} \sin^{-1}(x) - \csc^{-1}(y) &= \\ &\frac{1}{2} \pi \left( 2 \left[ \frac{\arg\left(\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}\right)}{\pi} \right] \left[ \frac{\arg\left(\sqrt{1-x^2} - ix\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)}{2\pi} \right] + (-1)^{\left\lfloor \frac{\arg\left(\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}\right)}{\pi} \right\rfloor} \right) + \\ &2 \left( 1 + (-1)^{\left\lfloor \frac{\arg\left(\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}\right)}{\pi} \right\rfloor} \right) \left[ \frac{1}{2} - \frac{\arg\left(\sqrt{1-x^2} - ix\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)}{2\pi} \right] - 1 \\ &\sin^{-1}\left( (-1)^{\left\lfloor \frac{\arg\left(\frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}}\right)}{\pi} \right\rfloor} \left( \frac{\sqrt{1-x^2}}{y} - x \sqrt{1-\frac{1}{y^2}} \right) \right) \end{aligned}$$

Involving  $\sec^{-1}(z)$

01.12.16.0171.01

$$\sin^{-1}(x) - \sec^{-1}(y) = \frac{\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} - \frac{x}{y}}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} - \frac{x}{y}\right)^2}} \sin^{-1}\left(\sqrt{1-\frac{1}{y^2}} x + \frac{\sqrt{1-x^2}}{y}\right) +$$

$$\pi \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)}{2\pi} \right] \left[ \frac{x - \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} y}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} - \frac{x}{y}\right)^2} y} + 1 \right] +$$

$$\frac{\pi}{2} \frac{x - \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} y}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} - \frac{x}{y}\right)^2} y} -$$

$$\pi \left[ \frac{\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} - \frac{x}{y}}{\sqrt{\left(\sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} - \frac{x}{y}\right)^2}} + 1 \right] \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right) - \pi}{2\pi} \right]$$

01.12.16.0172.01

$$\sin^{-1}(x) - \sec^{-1}(y) =$$

$$\frac{1}{2} \pi \left( 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\left| \arg\left( \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2} - \frac{x}{y}} \right) \right|}{\pi} \right\rfloor} \right) \left[ \frac{\arg\left( \sqrt{1-x^2} - ix \right) + \arg\left( \sqrt{1-\frac{1}{y^2} - \frac{i}{y}} \right)}{2\pi} \right] + (-1)^{\left\lfloor \frac{1}{2} - \frac{\left| \arg\left( \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2} - \frac{x}{y}} \right) \right|}{\pi} \right\rfloor} \right) +$$

$$2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\left| \arg\left( \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2} - \frac{x}{y}} \right) \right|}{\pi} \right\rfloor} \right) \left[ \frac{1}{2} - \frac{\arg\left( \sqrt{1-x^2} - ix \right) + \arg\left( \sqrt{1-\frac{1}{y^2} - \frac{i}{y}} \right)}{2\pi} \right] - 2 \right)$$

$$\sin^{-1} \left( (-1)^{\left\lfloor \frac{1}{2} - \frac{\left| \arg\left( \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2} - \frac{x}{y}} \right) \right|}{\pi} \right\rfloor} \left( -x \sqrt{1-\frac{1}{y^2}} - \frac{\sqrt{1-x^2}}{y} \right) \right)$$

### Involving $\sinh^{-1}(z)$

01.12.16.0173.01

$$\sin^{-1}(x) - \sinh^{-1}(y) = \log \left( \frac{(ix + \sqrt{1-x^2})^{-i}}{y + \sqrt{y^2+1}} \right) -$$

$$2i\pi \left( \left[ \frac{-\arg\left( \frac{1}{y + \sqrt{y^2+1}} \right) - \arg\left( (ix + \sqrt{1-x^2})^{-i} \right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Im}\left( \log(y + \sqrt{y^2+1}) \right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left( \log(ix + \sqrt{1-x^2}) \right) + \pi}{2\pi} \right] \right)$$

01.12.16.0174.01

$$\sin^{-1}(x) - \sinh^{-1}(y) =$$

$$i\pi \left[ 1 - (-1)^{\left\lfloor \frac{\arg\left(\frac{(ix+\sqrt{1-x^2})^{-i}}{y+\sqrt{y^2+1}}\right) + 1}{2\pi} \right\rfloor - \left\lfloor \frac{\arg\left(\frac{(ix+\sqrt{1-x^2})^{-i}}{y+\sqrt{y^2+1}}\right)}{2\pi} \right\rfloor} \right] + i(-1)^{\left\lfloor \frac{\arg\left(\frac{(ix+\sqrt{1-x^2})^{-i}}{y+\sqrt{y^2+1}}\right) - 1}{2\pi} + \frac{1}{2} - \frac{\arg\left(\frac{(ix+\sqrt{1-x^2})^{-i}}{y+\sqrt{y^2+1}}\right) + 1}{2\pi} \right\rfloor + \left\lfloor \frac{\arg\left(\frac{(ix+\sqrt{1-x^2})^{-i}}{y+\sqrt{y^2+1}}\right)}{\pi} \right\rfloor} \right]$$

$$\left( \sin^{-1} \left( \frac{1}{2} (ix + \sqrt{1-x^2})^i (y + \sqrt{y^2+1}) \left( \frac{(ix + \sqrt{1-x^2})^{-2i}}{(y + \sqrt{y^2+1})^2} + 1 \right) \right) - \frac{\pi}{2} \right) -$$

$$2i\pi \left[ \frac{-\arg\left(\frac{1}{y+\sqrt{y^2+1}}\right) - \arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{y+\sqrt{y^2+1}}\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Im}(\log(y + \sqrt{y^2+1})) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}(\log(ix + \sqrt{1-x^2})) + \pi}{2\pi} \right]$$

01.12.16.0175.01

$$\sin^{-1}(x) - i \sinh^{-1}(y) = - \frac{i (ixy + \sqrt{1-x^2} \sqrt{y^2+1})}{\sqrt{(ixy + \sqrt{1-x^2} \sqrt{y^2+1})^2}} \sinh^{-1}(i \sqrt{y^2+1} x + \sqrt{1-x^2} y) +$$

$$\pi \left[ \frac{\arg(ix + \sqrt{1-x^2}) + \arg(y + \sqrt{y^2+1})}{2\pi} \right] \left[ 1 - \frac{ixy + \sqrt{1-x^2} \sqrt{y^2+1}}{\sqrt{(ixy + \sqrt{1-x^2} \sqrt{y^2+1})^2}} \right] +$$

$$\frac{1}{2} \pi \left[ 1 - \frac{ixy + \sqrt{1-x^2} \sqrt{y^2+1}}{\sqrt{(ixy + \sqrt{1-x^2} \sqrt{y^2+1})^2}} \right] -$$

$$\pi \left[ \frac{ixy + \sqrt{1-x^2} \sqrt{y^2+1}}{\sqrt{(ixy + \sqrt{1-x^2} \sqrt{y^2+1})^2}} + 1 \right] \left[ \frac{-\arg(ix + \sqrt{1-x^2}) - \arg(y + \sqrt{y^2+1}) + \pi}{2\pi} \right]$$



01.12.16.0176.01

$$\sin^{-1}(x) - i \sinh^{-1}(y) = \sin^{-1} \left( (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(ixy + \sqrt{1-x^2} \sqrt{y^2+1})}{\pi} \right\rfloor} \left( x \sqrt{y^2+1} - i \sqrt{1-x^2} y \right) \right) -$$

$$\frac{1}{2} \pi \left( 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(ixy + \sqrt{1-x^2} \sqrt{y^2+1})}{\pi} \right\rfloor} \right) \left\lfloor \frac{\arg(i x + \sqrt{1-x^2}) + \arg(y + \sqrt{y^2+1})}{2\pi} \right\rfloor + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(ixy + \sqrt{1-x^2} \sqrt{y^2+1})}{\pi} \right\rfloor} \right) +$$

$$2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(ixy + \sqrt{1-x^2} \sqrt{y^2+1})}{\pi} \right\rfloor} \right) \left\lfloor \frac{1}{2} - \frac{\arg(i x + \sqrt{1-x^2}) + \arg(y + \sqrt{y^2+1})}{2\pi} \right\rfloor - 1 \right)$$

### Involving $\cosh^{-1}(z)$

01.12.16.0177.01

$$\sin^{-1}(x) - \cosh^{-1}(y) = \log \left( \frac{(ix + \sqrt{1-x^2})^{-i}}{y + \sqrt{y-1} \sqrt{y+1}} \right) - 2i\pi \left( \left\lfloor \frac{-\arg\left(\frac{1}{y + \sqrt{y-1} \sqrt{y+1}}\right) - \arg\left((ix + \sqrt{1-x^2})^{-i}\right) + \pi}{2\pi} \right\rfloor + \right.$$

$$\left. \left\lfloor \frac{\operatorname{Im}(\log(y + \sqrt{y-1} \sqrt{y+1})) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\operatorname{Re}(\log(ix + \sqrt{1-x^2})) + \pi}{2\pi} \right\rfloor \right)$$

01.12.16.0178.01

$$\sin^{-1}(x) - \cosh^{-1}(y) =$$

$$i\pi \left[ \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{y + \sqrt{y-1}\sqrt{y+1}} + 1\right)}{2\pi} - \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{y + \sqrt{y-1}\sqrt{y+1}}\right)}{2\pi} \right] + i(-1) \left[ \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{y + \sqrt{y-1}\sqrt{y+1}} - 1\right)}{2\pi} + \frac{1}{2} \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{y + \sqrt{y-1}\sqrt{y+1}} + 1\right)}{2\pi} \right] + \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{y + \sqrt{y-1}\sqrt{y+1}}\right)}{\pi}$$

$$\left( \sin^{-1} \left( \frac{1}{2} (ix + \sqrt{1-x^2})^i (y + \sqrt{y-1}\sqrt{y+1}) \left( \frac{(ix + \sqrt{1-x^2})^{-2i}}{(y + \sqrt{y-1}\sqrt{y+1})^2} + 1 \right) \right) - \frac{\pi}{2} \right) -$$

$$2i\pi \left[ \frac{-\arg\left(\frac{1}{y + \sqrt{y-1}\sqrt{y+1}}\right) - \arg\left((ix + \sqrt{1-x^2})^{-i}\right) + \pi}{2\pi} \right] +$$

$$\left[ \frac{\operatorname{Im}(\log(y + \sqrt{y-1}\sqrt{y+1})) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}(\log(ix + \sqrt{1-x^2})) + \pi}{2\pi} \right]$$

01.12.16.0179.01

$$\begin{aligned} \sin^{-1}(x) - i \cosh^{-1}(y) = & -\sin^{-1} \left( (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(-xy + i\sqrt{1-x^2}\sqrt{y-1}\sqrt{y+1})}{\pi} \right\rfloor} \left( -i\sqrt{y-1}\sqrt{y+1}x - \sqrt{1-x^2}y \right) \right) - \\ & \frac{1}{2} \pi \left( \frac{1}{2} \left( 1 - (-1)^{\left\lfloor -\frac{\arg(1-y)}{2\pi} \right\rfloor} \right) \right) \left( 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2}\sqrt{1-y^2}-xy)}{\pi} \right\rfloor} \right) \right) \left[ \frac{\arg(ix + \sqrt{1-x^2}) + \arg(iy + \sqrt{1-y^2})}{2\pi} \right] + \\ & (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2}\sqrt{1-y^2}-xy)}{\pi} \right\rfloor} + 2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(\sqrt{1-x^2}\sqrt{1-y^2}-xy)}{\pi} \right\rfloor} \right) \left[ \frac{1}{2} - \frac{\arg(ix + \sqrt{1-x^2}) + \arg(iy + \sqrt{1-y^2})}{2\pi} \right] - \\ & \frac{1}{2} \left( 1 + (-1)^{\left\lfloor -\frac{\arg(1-y)}{2\pi} \right\rfloor} \right) \left( 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(xy + \sqrt{1-x^2}\sqrt{1-y^2})}{\pi} \right\rfloor} \right) \right) \left[ \frac{\arg(\sqrt{1-x^2} - ix) + \arg(iy + \sqrt{1-y^2})}{2\pi} \right] + \\ & (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(xy + \sqrt{1-x^2}\sqrt{1-y^2})}{\pi} \right\rfloor} + 2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg(xy + \sqrt{1-x^2}\sqrt{1-y^2})}{\pi} \right\rfloor} \right) \left[ \frac{1}{2} - \frac{\arg(\sqrt{1-x^2} - ix) + \arg(iy + \sqrt{1-y^2})}{2\pi} \right] \end{aligned}$$

Involving  $\tanh^{-1}(z)$

01.12.16.0180.01

$$\sin^{-1}(x) - \tanh^{-1}(y) = -2i\pi \left( \left[ \frac{\frac{1}{2} \arg(y+1) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1-y}\right) + \pi}{2\pi} \right] + \left[ \frac{\frac{1}{2} \operatorname{Im}(\log(y+1)) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1-y}\right)\right)}{2\pi} \right] \right) - 2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i}\right) - \frac{1}{2} \arg(1-y) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(\log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \frac{1}{2} \operatorname{Im}(\log(1-y))}{2\pi} \right] \right) + \log\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1-y}}{\sqrt{y+1}}\right)$$

01.12.16.0181.01

$$\sin^{-1}(x) - \tanh^{-1}(y) = -2i\pi \left( \left[ \frac{\frac{1}{2} \arg(y+1) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1-y}\right) + \pi}{2\pi}} \right] + \left[ \frac{\frac{1}{2} \operatorname{Im}(\log(y+1)) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1-y}\right)\right)}{2\pi} \right] \right) - 2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i}\right) - \frac{1}{2} \arg(1-y) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(\log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \frac{1}{2} \operatorname{Im}(\log(1-y))}{2\pi} \right] \right) + i\pi \left( \left[ \frac{\arg\left(\frac{\sqrt{1-y}\left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{y+1}}\right) + 1}{2\pi} \right] - \left[ \frac{\arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1-y}}{\sqrt{y+1}}\right)}{2\pi} \right] \right) + i(-1) \left( \left[ \frac{\arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1-y}}{\sqrt{y+1}}\right) - 1}{2\pi} \right] + \frac{1}{2} \left[ \frac{\arg\left(\frac{\sqrt{1-y}\left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{y+1}}\right) + 1}{2\pi} \right] - \left[ \frac{\arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1-y}}{\sqrt{y+1}}\right)}{\pi} \right] \right) + \left( \sin^{-1} \left( \frac{\left(ix + \sqrt{1-x^2}\right)^i \sqrt{y+1} \left( \frac{(1-y)\left(ix + \sqrt{1-x^2}\right)^{-2i}}{y+1} + 1 \right)}{2\sqrt{1-y}} \right) - \frac{\pi}{2} \right)$$

01.12.16.0182.01

$$\sin^{-1}(x) - i \tanh^{-1}(y) = \frac{1}{2 \sqrt{\frac{(x-i\sqrt{1-x^2}y)^2}{1-y^2}} \sqrt{1-y^2}} \left( (x-i\sqrt{1-x^2}y) \left( \pi - 2 \sin^{-1} \left( \frac{ixy + \sqrt{1-x^2}}{\sqrt{1-y^2}} \right) \right) \right) +$$

$$2\pi \left( x - i\sqrt{1-x^2}y + \sqrt{\frac{y^2x^2 + x^2 - 2i\sqrt{1-x^2}yx - y^2}{1-y^2}} \sqrt{1-y^2} \right) \left[ \frac{\arg(ix + \sqrt{1-x^2}) + \arg\left(\frac{i+iy}{\sqrt{1-y^2}}\right)}{2\pi} \right] -$$

$$2\pi \left( -x + i\sqrt{1-x^2}y + \sqrt{\frac{y^2x^2 + x^2 - 2i\sqrt{1-x^2}yx - y^2}{1-y^2}} \sqrt{1-y^2} \right) \left[ \frac{\arg(ix + \sqrt{1-x^2}) + \arg\left(\frac{i+iy}{\sqrt{1-y^2}}\right) - \pi}{2\pi} \right]$$

01.12.16.0183.01

$$\sin^{-1}(x) - i \tanh^{-1}(y) =$$

$$\sin^{-1} \left( \frac{(-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x-i\sqrt{1-x^2}y}{\sqrt{1-y^2}}\right)}{\pi} \rfloor} (-ixy - \sqrt{1-x^2})}{\sqrt{1-y^2}} \right) + \frac{1}{2} \pi \left( 2 \left( 1 + (-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x-i\sqrt{1-x^2}y}{\sqrt{1-y^2}}\right)}{\pi} \rfloor} \right) \left[ \frac{\arg(ix + \sqrt{1-x^2}) + \arg\left(\frac{i+iy}{\sqrt{1-y^2}}\right)}{2\pi} \right] \right) +$$

$$(-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x-i\sqrt{1-x^2}y}{\sqrt{1-y^2}}\right)}{\pi} \rfloor} - 2 \left( -1 + (-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\frac{x-i\sqrt{1-x^2}y}{\sqrt{1-y^2}}\right)}{\pi} \rfloor} \right) \left[ \frac{1}{2} - \frac{\arg(ix + \sqrt{1-x^2}) + \arg\left(\frac{i+iy}{\sqrt{1-y^2}}\right)}{2\pi} \right]$$

Involving  $\coth^{-1}(z)$

01.12.16.0184.01

$$\sin^{-1}(x) - \coth^{-1}(y) = -2i\pi \left[ \frac{\frac{1}{2} \arg\left(1 + \frac{1}{y}\right) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1 - \frac{1}{y}}\right) + \pi}{2\pi} \right] +$$

$$\left[ \frac{\frac{1}{2} \operatorname{Im}\left(\log\left(1 + \frac{1}{y}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1 - \frac{1}{y}}\right)\right)}{2\pi} \right] -$$

$$2i\pi \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i}\right) - \frac{1}{2} \arg\left(1 - \frac{1}{y}\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(\log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \frac{1}{2} \operatorname{Im}\left(\log\left(1 - \frac{1}{y}\right)\right)}{2\pi} \right] +$$

$$\log \left( \frac{\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1 - \frac{1}{y}}}{\sqrt{1 + \frac{1}{y}}} \right)$$

01.12.16.0185.01

$$\sin^{-1}(x) - \coth^{-1}(y) = -2i\pi \left( \left[ \frac{\frac{1}{2} \arg\left(1 + \frac{1}{y}\right) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1 - \frac{1}{y}}\right) + \pi}{2\pi} \right] + \left[ \frac{\frac{1}{2} \operatorname{Im}\left(\log\left(1 + \frac{1}{y}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1 - \frac{1}{y}}\right)\right)}{2\pi} \right] \right) - 2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-i}\right) - \frac{1}{2} \arg\left(1 - \frac{1}{y}\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(\log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \frac{1}{2} \operatorname{Im}\left(\log\left(1 - \frac{1}{y}\right)\right)}{2\pi} \right] \right) + i\pi \left( \left[ \frac{\arg\left(\frac{\sqrt{1 - \frac{1}{y}} \left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{1 + \frac{1}{y}}}\right) + 1}{2\pi} \right] - \left[ \frac{\arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1 - \frac{1}{y}}}{\sqrt{1 + \frac{1}{y}}}\right)}{2\pi} \right] \right) + i(-1) \left( \left[ \frac{\arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1 - \frac{1}{y}}}{\sqrt{1 + \frac{1}{y}}}\right) - 1}{2\pi} \right] + \frac{1}{2} \left[ \frac{\arg\left(\frac{\sqrt{1 - \frac{1}{y}} \left(ix + \sqrt{1-x^2}\right)^{-i}}{\sqrt{1 + \frac{1}{y}}}\right) + 1}{2\pi} \right] + \left[ \frac{\arg\left(\frac{\left(ix + \sqrt{1-x^2}\right)^{-i} \sqrt{1 - \frac{1}{y}}}{\sqrt{1 + \frac{1}{y}}}\right)}{\pi} \right] \right) + \left( \sin^{-1} \left( \frac{\left(ix + \sqrt{1-x^2}\right)^i \left(\frac{\left(1 - \frac{1}{y}\right) \left(ix + \sqrt{1-x^2}\right)^{-2i}}{1 + \frac{1}{y}} + 1\right) \sqrt{1 + \frac{1}{y}}}{2\sqrt{1 - \frac{1}{y}}} \right) - \frac{\pi}{2} \right)$$



01.12.16.0186.01

$$\sin^{-1}(x) - i \coth^{-1}(y) = - \frac{1}{2 \sqrt{1 - \frac{1}{y^2}} y \sqrt{\frac{(ixy + \sqrt{1-x^2})^2}{1-y^2}}} \left( i \left( ix y + \sqrt{1-x^2} \right) \left( \pi - 2 \sin^{-1} \left( \frac{\frac{ix}{y} + \sqrt{1-x^2}}{\sqrt{1 - \frac{1}{y^2}}} \right) \right) + \right.$$

$$\left. 2 \pi \left( ix y + i \sqrt{\frac{(-y^2 - 1)x^2 + 2i \sqrt{1-x^2} y x + 1}{1-y^2}} \sqrt{1 - \frac{1}{y^2}} y + \sqrt{1-x^2} \right) \left[ \frac{\arg(ix + \sqrt{1-x^2}) + \arg\left(\frac{i + \frac{i}{y}}{\sqrt{1 - \frac{1}{y^2}}}\right)}{2 \pi} \right] + \right.$$

$$\left. 2 \pi \left( ix y - i \sqrt{1 - \frac{1}{y^2}} \sqrt{\frac{(-y^2 - 1)x^2 + 2i \sqrt{1-x^2} y x + 1}{1-y^2}} y + \sqrt{1-x^2} \right) \left[ \frac{\arg(ix + \sqrt{1-x^2}) + \arg\left(\frac{i + \frac{i}{y}}{\sqrt{1 - \frac{1}{y^2}}}\right) - \pi}{2 \pi} \right] \right)$$

01.12.16.0187.01

$$\sin^{-1}(x) - i \operatorname{coth}^{-1}(y) =$$

$$\sin^{-1} \left( \frac{(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x - i\sqrt{1-x^2}}{y} \right)}{\pi} \right\rfloor} \left( -\frac{ix}{y} - \sqrt{1-x^2} \right)}{\sqrt{1 - \frac{1}{y^2}}} \right) + \frac{1}{2} \pi \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x - i\sqrt{1-x^2}}{y} \right)}{\pi} \right\rfloor} \right) \frac{\arg \left( ix + \sqrt{1-x^2} \right) + \arg \left( \frac{i + \frac{i}{y}}{\sqrt{1 - \frac{1}{y^2}}} \right)}{2\pi} +$$

$$(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x - i\sqrt{1-x^2}}{y} \right)}{\pi} \right\rfloor} - 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x - i\sqrt{1-x^2}}{y} \right)}{\pi} \right\rfloor} \right) \frac{1}{2} \frac{\arg \left( ix + \sqrt{1-x^2} \right) + \arg \left( \frac{i + \frac{i}{y}}{\sqrt{1 - \frac{1}{y^2}}} \right)}{2\pi}$$

### Involving $\operatorname{csch}^{-1}(z)$

01.12.16.0188.01

$$\sin^{-1}(x) - \operatorname{csch}^{-1}(y) = \log \left( \frac{\left( ix + \sqrt{1-x^2} \right)^{-i}}{\sqrt{1 + \frac{1}{y^2} + \frac{1}{y}}} \right) -$$

$$2i\pi \left( \frac{-\arg \left( \left( ix + \sqrt{1-x^2} \right)^{-i} \right) - \arg \left( \frac{1}{\sqrt{1 + \frac{1}{y^2} + \frac{1}{y}}} \right) + \pi}{2\pi} \right) + \left( \frac{\operatorname{Im} \left( \log \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right) \right) + \pi}{2\pi} \right) + \left( \frac{\operatorname{Re} \left( \log \left( ix + \sqrt{1-x^2} \right) \right) + \pi}{2\pi} \right)$$

01.12.16.0189.01

$$\sin^{-1}(x) - \operatorname{csch}^{-1}(y) =$$

$$i\pi \left( 1 - (-1) \left[ \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{\sqrt{1 + \frac{1}{y^2} + \frac{1}{y}}}\right) + 1}{2\pi} \right] - \left[ \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{\sqrt{1 + \frac{1}{y^2} + \frac{1}{y}}}\right) + 1}{2\pi} \right] \right) + i(-1) \left[ \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{\sqrt{1 + \frac{1}{y^2} + \frac{1}{y}}}\right) - 1}{2\pi} + \frac{1}{2} - \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{\sqrt{1 + \frac{1}{y^2} + \frac{1}{y}}}\right) + 1}{2\pi} \right] - \left[ \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{\sqrt{1 + \frac{1}{y^2} + \frac{1}{y}}}\right)}{\pi} \right]$$

$$\sin^{-1} \left( \frac{1}{2} (ix + \sqrt{1-x^2})^i \left( \frac{(ix + \sqrt{1-x^2})^{-2i}}{\left(\sqrt{1 + \frac{1}{y^2} + \frac{1}{y}}\right)^2} + 1 \right) \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right) - \frac{\pi}{2} \right) -$$

$$2i\pi \left( \frac{-\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{\sqrt{1 + \frac{1}{y^2} + \frac{1}{y}}}\right) - \arg\left(\frac{1}{\sqrt{1 + \frac{1}{y^2} + \frac{1}{y}}}\right) + \pi}{2\pi} \right) + \left[ \frac{\operatorname{Im}\left(\log\left(\sqrt{1 + \frac{1}{y^2} + \frac{1}{y}}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(\log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right]$$

01.12.16.0190.01

$$\sin^{-1}(x) - i \operatorname{csch}^{-1}(y) = \frac{\frac{ix}{y} + \sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}}}{\sqrt{\left(\frac{ix}{y} + \sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}}\right)^2}} \sin^{-1}\left(x \sqrt{1+\frac{1}{y^2}} - \frac{i \sqrt{1-x^2}}{y}\right) +$$

$$\pi \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1+\frac{1}{y^2}} + \frac{1}{y}\right)}{2\pi} \right] \left[ 1 - \frac{i\left(x - i \sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}} y\right)}{\sqrt{\left(\frac{ix}{y} + \sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}}\right)^2} y} \right] +$$

$$\frac{1}{2} \pi \left[ 1 - \frac{i\left(x - i \sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}} y\right)}{\sqrt{\left(\frac{ix}{y} + \sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}}\right)^2} y} \right] -$$

$$\pi \left[ \frac{\frac{ix}{y} + \sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}}}{\sqrt{\left(\frac{ix}{y} + \sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}}\right)^2}} + 1 \right] \left[ \frac{\arg\left(ix + \sqrt{1-x^2}\right) + \arg\left(\sqrt{1+\frac{1}{y^2}} + \frac{1}{y}\right) - \pi}{2\pi} \right]$$

01.12.16.0191.01

$$\sin^{-1}(x) - i \operatorname{csch}^{-1}(y) = \sin^{-1} \left( (-1)^{\left\lfloor \frac{1}{2} - \frac{\left| \arg \left( \frac{ix}{y} + \sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}} \right) \right|}{\pi} \right\rfloor} \left[ x \sqrt{1 + \frac{1}{y^2}} - \frac{i \sqrt{1-x^2}}{y} \right] \right) -$$

$$\frac{1}{2} \pi \left( 2 \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\left| \arg \left( \frac{ix}{y} + \sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}} \right) \right|}{\pi} \right\rfloor} \left[ \frac{\arg \left( ix + \sqrt{1-x^2} \right) + \arg \left( \sqrt{1 + \frac{1}{y^2}} + \frac{1}{y} \right)}{2\pi} \right] + (-1)^{\left\lfloor \frac{1}{2} - \frac{\left| \arg \left( \frac{ix}{y} + \sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}} \right) \right|}{\pi} \right\rfloor} \right) +$$

$$2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\left| \arg \left( \frac{ix}{y} + \sqrt{1-x^2} \sqrt{1+\frac{1}{y^2}} \right) \right|}{\pi} \right\rfloor} \left[ \frac{1}{2} - \frac{\arg \left( ix + \sqrt{1-x^2} \right) + \arg \left( \sqrt{1 + \frac{1}{y^2}} + \frac{1}{y} \right)}{2\pi} \right] - 1 \right)$$

### Involving $\operatorname{sech}^{-1}(z)$

01.12.16.0192.01

$$\sin^{-1}(x) - \operatorname{sech}^{-1}(y) = \log \left( \frac{\left( ix + \sqrt{1-x^2} \right)^{-i}}{\sqrt{\frac{1}{y}-1} \sqrt{1 + \frac{1}{y} + \frac{1}{y}}} \right) - 2i\pi \left( \frac{-\arg \left( \left( ix + \sqrt{1-x^2} \right)^{-i} \right) - \arg \left( \frac{1}{\sqrt{\frac{1}{y}-1} \sqrt{1 + \frac{1}{y} + \frac{1}{y}}} \right) + \pi}{2\pi} \right) +$$

$$\left[ \frac{\operatorname{Im} \left( \log \left( \sqrt{\frac{1}{y}-1} \sqrt{1 + \frac{1}{y} + \frac{1}{y}} \right) \right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re} \left( \log \left( ix + \sqrt{1-x^2} \right) \right) + \pi}{2\pi} \right]$$

01.12.16.0193.01

$$\sin^{-1}(x) - \operatorname{sech}^{-1}(y) =$$

$$i\pi \left( 1 - (-1) \left[ \frac{\left| \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}}\right)+1}{2\pi} \right|}{2\pi} \right] - \left[ \frac{\left| \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}}\right)-1}{2\pi} \right|}{2\pi} \right] + i(-1) \left[ \frac{\left| \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}}\right)-1}{2\pi} \right|}{2\pi} + \frac{1}{2} \frac{\left| \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}}\right)+1}{2\pi} \right|}{2\pi} \right] + \left[ \frac{\left| \frac{\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}}\right)}{\pi} \right|}{\pi} \right] \right)$$

$$\left( \sin^{-1} \left( \frac{1}{2} (ix + \sqrt{1-x^2})^i \left( \frac{(ix + \sqrt{1-x^2})^{-2i}}{\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)^2} + 1 \right) \left( \sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}} \right) - \frac{\pi}{2} \right) \right)$$

$$2i\pi \left( \frac{-\arg\left(\frac{(ix + \sqrt{1-x^2})^{-i}}{\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}}\right) - \arg\left(\frac{1}{\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}}\right) + \pi}{2\pi} \right) +$$

$$\left( \frac{\operatorname{Im}\left(\log\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)\right) + \pi}{2\pi} \right) + \left( \frac{\operatorname{Re}\left(\log(ix + \sqrt{1-x^2})\right) + \pi}{2\pi} \right)$$

01.12.16.0194.01

$$\sin^{-1}(x) - i \operatorname{sech}^{-1}(y) = -\sin^{-1} \left( (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( i \sqrt{1-x^2} \sqrt{\frac{1}{y}-1} \sqrt{1+\frac{1}{y}-\frac{x}{y}} \right)}{\pi} \right\rfloor} \left( -i \sqrt{\frac{1}{y}-1} \sqrt{1+\frac{1}{y}} x - \frac{\sqrt{1-x^2}}{y} \right) \right) -$$

$$\frac{1}{2} \pi \left( \frac{1}{2} \left( 1 - (-1)^{\left\lfloor -\frac{\arg \left( 1 - \frac{1}{y} \right)}{2\pi} \right\rfloor} \right) \left( \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}-\frac{x}{y}} \right)}{\pi} \right\rfloor} \right) \left( \frac{\arg \left( i x + \sqrt{1-x^2} \right) + \arg \left( \sqrt{1-\frac{1}{y^2}} + \frac{i}{y} \right)}{2\pi} \right) \right) +$$

$$(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}-\frac{x}{y}} \right)}{\pi} \right\rfloor} + 2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}-\frac{x}{y}} \right)}{\pi} \right\rfloor} \right) \left( \frac{1}{2} - \frac{\arg \left( i x + \sqrt{1-x^2} \right) + \arg \left( \sqrt{1-\frac{1}{y^2}} + \frac{i}{y} \right)}{2\pi} \right) \right) -$$

$$\frac{1}{2} \left( 1 + (-1)^{\left\lfloor -\frac{\arg \left( 1 - \frac{1}{y} \right)}{2\pi} \right\rfloor} \right) \left( \left( -1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} \right)}{\pi} \right\rfloor} \right) \left( \frac{\arg \left( \sqrt{1-x^2} - i x \right) + \arg \left( \sqrt{1-\frac{1}{y^2}} + \frac{i}{y} \right)}{2\pi} \right) \right) +$$

$$(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} \right)}{\pi} \right\rfloor} + 2 \left( 1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg \left( \frac{x}{y} + \sqrt{1-x^2} \sqrt{1-\frac{1}{y^2}} \right)}{\pi} \right\rfloor} \right) \left( \frac{1}{2} - \frac{\arg \left( \sqrt{1-x^2} - i x \right) + \arg \left( \sqrt{1-\frac{1}{y^2}} + \frac{i}{y} \right)}{2\pi} \right) \right)$$

**Linear combinations involving the direct function**

**Involving log(z)**

01.12.16.0195.01

$$a \sin^{-1}(x) + b \log(y) = \log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} y^b\right) - 2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg(y^b) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}(b \log(y))}{2\pi} \right] \right)$$

01.12.16.0196.01

$$a \sin^{-1}(x) + b \log(y) = i\pi \left( 1 - (-1)^{\left\lfloor \frac{\arg\left(y^b \left(ix + \sqrt{1-x^2}\right)^{-ia} + 1\right)}{2\pi} \right\rfloor - \left\lfloor \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} y^b\right)}{2\pi} \right\rfloor \right) + i(-1)^{\left\lfloor \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} y^{b-1}\right)}{2\pi} + \frac{1}{2} - \frac{\arg\left(y^b \left(ix + \sqrt{1-x^2}\right)^{-ia} + 1\right)}{2\pi} \right\rfloor + \left\lfloor \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} y^b\right)}{\pi} \right\rfloor \right) \left( \sin^{-1}\left(\frac{1}{2}\left(ix + \sqrt{1-x^2}\right)^{ia} y^{-b} \left(y^{2b} \left(ix + \sqrt{1-x^2}\right)^{-2ia} + 1\right)\right) - \frac{\pi}{2} \right) - 2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg(y^b) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}(b \log(y))}{2\pi} \right] \right)$$

### Involving $\cos^{-1}(z)$

01.12.16.0197.01

$$a \sin^{-1}(x) + b \cos^{-1}(y) = \frac{\pi b}{2} - 2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left(\left(iy + \sqrt{1-y^2}\right)^{ib}\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Re}\left(b \log\left(iy + \sqrt{1-y^2}\right)\right)}{2\pi} \right] \right) + \log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(iy + \sqrt{1-y^2}\right)^{ib}\right)$$



01.12.16.0198.01

$$\begin{aligned}
 a \sin^{-1}(x) + b \cos^{-1}(y) &= \frac{\pi b}{2} - i(-1) \left[ \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(iy + \sqrt{1-y^2}\right)^{ib} - 1\right)}{2\pi} + \frac{1}{2} \frac{\arg\left(\left(iy + \sqrt{1-y^2}\right)^{ib} \left(ix + \sqrt{1-x^2}\right)^{-ia} + 1\right)}{2\pi} \right] + \left[ \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(iy + \sqrt{1-y^2}\right)^{ib}\right)}{\pi} \right] \\
 \cos^{-1}\left(\frac{1}{2} \left(ix + \sqrt{1-x^2}\right)^{ia} \left(iy + \sqrt{1-y^2}\right)^{-ib} \left(\left(iy + \sqrt{1-y^2}\right)^{2ib} \left(ix + \sqrt{1-x^2}\right)^{-2ia} + 1\right)\right) &- \\
 2i\pi \left( \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left(\left(iy + \sqrt{1-y^2}\right)^{ib}\right) + \pi}{2\pi} \right) &+ \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \\
 \left[ \frac{\pi - \operatorname{Re}\left(b \log\left(iy + \sqrt{1-y^2}\right)\right)}{2\pi} \right] &+ \left( 1 - (-1) \left[ \frac{\arg\left(\left(iy + \sqrt{1-y^2}\right)^{ib} \left(ix + \sqrt{1-x^2}\right)^{-ia} + 1\right)}{2\pi} \right] - \left[ \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(iy + \sqrt{1-y^2}\right)^{ib}\right)}{2\pi} \right] \right) i\pi
 \end{aligned}$$

### Involving $\tan^{-1}(z)$

01.12.16.0199.01

$$\begin{aligned}
 a \sin^{-1}(x) + b \tan^{-1}(y) &= -2i\pi \left( \frac{-\arg\left(\left(iy + 1\right)^{-\frac{1}{2}(ib)}\right) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - iy\right)^{\frac{ib}{2}}\right) + \pi}{2\pi} \right) + \\
 \left[ \frac{\frac{1}{2} \operatorname{Re}\left(b \log(iy + 1)\right) + \pi}{2\pi} \right] &+ \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - iy\right)^{\frac{ib}{2}}\right)\right)}{2\pi} \right] - \\
 2i\pi \left( \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left(\left(1 - iy\right)^{\frac{ib}{2}}\right) + \pi}{2\pi} \right) &+ \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \frac{1}{2} \operatorname{Re}\left(b \log(1 - iy)\right)}{2\pi} \right] + \\
 \log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - iy\right)^{\frac{ib}{2}} \left(iy + 1\right)^{-\frac{1}{2}(ib)}\right) &
 \end{aligned}$$

01.12.16.0200.01

$$a \sin^{-1}(x) + b \tan^{-1}(y) =$$

$$\begin{aligned}
 & -2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left((1-iy)^{\frac{ib}{2}}\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \frac{1}{2} \operatorname{Re}(b \log(1-iy))}{2\pi} \right] \right) \\
 & 2i\pi \left( \left[ \frac{-\arg\left((iy+1)^{-\frac{1}{2}(ib)}\right) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} (1-iy)^{\frac{ib}{2}}\right) + \pi}{2\pi} \right] + \right. \\
 & \left. \left[ \frac{\frac{1}{2} \operatorname{Re}(b \log(iy+1)) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} (1-iy)^{\frac{ib}{2}}\right)\right)}{2\pi} \right] \right) + \\
 & i \left( 1 - (-1)^i \left[ \frac{\arg\left((iy+1)^{-\frac{1}{2}(ib)}\left(ix + \sqrt{1-x^2}\right)^{-ia} (1-iy)^{\frac{ib}{2}+1}\right) + \frac{1}{2}}{2\pi} \right] \right) \pi + 2i \tan^{-1} \left( i \frac{1 - \left(ix + \sqrt{1-x^2}\right)^{-ia} (1-iy)^{\frac{ib}{2}} (iy+1)^{-\frac{1}{2}(ib)}}{\left(iy+1\right)^{-\frac{1}{2}(ib)} \left(ix + \sqrt{1-x^2}\right)^{-ia} (1-iy)^{\frac{ib}{2}} + 1} \right)
 \end{aligned}$$

### Involving $\cot^{-1}(z)$

01.12.16.0201.01

$$\begin{aligned}
 a \sin^{-1}(x) + b \cot^{-1}(y) &= -2i\pi \left( \left[ \frac{-\arg\left(\left(1 + \frac{i}{y}\right)^{-\frac{1}{2}(ib)}\right) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - \frac{i}{y}\right)^{\frac{ib}{2}}\right) + \pi}{2\pi} \right] + \right. \\
 & \left. \left[ \frac{\frac{1}{2} \operatorname{Re}\left(b \log\left(1 + \frac{i}{y}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - \frac{i}{y}\right)^{\frac{ib}{2}}\right)\right)}{2\pi} \right] \right) - \\
 & 2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left(\left(1 - \frac{i}{y}\right)^{\frac{ib}{2}}\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \frac{1}{2} \operatorname{Re}\left(b \log\left(1 - \frac{i}{y}\right)\right)}{2\pi} \right] \right) + \\
 & \log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - \frac{i}{y}\right)^{\frac{ib}{2}} \left(1 + \frac{i}{y}\right)^{-\frac{1}{2}(ib)}\right)
 \end{aligned}$$

01.12.16.0202.01

$$a \sin^{-1}(x) + b \cot^{-1}(y) =$$

$$\begin{aligned}
 & -2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left(\left(1 - \frac{i}{y}\right)^{\frac{ib}{2}}\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \frac{1}{2} \operatorname{Re}\left(b \log\left(1 - \frac{i}{y}\right)\right)}{2\pi} \right] \right) - \\
 & 2i\pi \left( \left[ \frac{-\arg\left(\left(1 + \frac{i}{y}\right)^{-\frac{1}{2}(ib)}\right) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - \frac{i}{y}\right)^{\frac{ib}{2}}\right) + \pi}{2\pi} \right] + \right. \\
 & \left. \left[ \frac{\frac{1}{2} \operatorname{Re}\left(b \log\left(1 + \frac{i}{y}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - \frac{i}{y}\right)^{\frac{ib}{2}}\right)\right)}{2\pi} \right] \right) + \\
 & i\pi \left( 1 - (-1)^{\lfloor \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 + \frac{i}{y}\right)^{-\frac{1}{2}(ib)}\right) \left(1 - \frac{i}{y}\right)^{\frac{ib}{2}} + 1}{2\pi} \rfloor + \frac{1}{2} \right) + 2i \cot^{-1} \left( \frac{i \left( \left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 + \frac{i}{y}\right)^{-\frac{1}{2}(ib)} \left(1 - \frac{i}{y}\right)^{\frac{ib}{2}} + 1 \right)}{\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - \frac{i}{y}\right)^{\frac{ib}{2}} \left(1 + \frac{i}{y}\right)^{-\frac{1}{2}(ib)} - 1} \right)
 \end{aligned}$$

### Involving $\csc^{-1}(z)$

01.12.16.0203.01

$$a \sin^{-1}(x) + b \csc^{-1}(y) =$$

$$\begin{aligned}
 & \log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(\sqrt{1 - \frac{1}{y^2}} + \frac{i}{y}\right)^{-ib}\right) - 2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left(\left(\sqrt{1 - \frac{1}{y^2}} + \frac{i}{y}\right)^{-ib}\right) + \pi}{2\pi} \right] + \right. \\
 & \left. \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(b \log\left(\sqrt{1 - \frac{1}{y^2}} + \frac{i}{y}\right)\right) + \pi}{2\pi} \right] \right)
 \end{aligned}$$

01.12.16.0204.01

$$a \sin^{-1}(x) + b \csc^{-1}(y) = i\pi \left[ 1 - (-1) \left| \frac{\arg\left(\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)^{-ib} (ix + \sqrt{1-x^2})^{-ia} + 1\right)}{2\pi} \right| - \left| \frac{\arg\left((ix + \sqrt{1-x^2})^{-ia} \left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)^{-ib}\right)}{2\pi} \right| \right] +$$

$$i(-1) \left| \frac{\arg\left((ix + \sqrt{1-x^2})^{-ia} \left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)^{-ib} - 1\right)}{2\pi} + \frac{1}{2} \frac{\arg\left(\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)^{-ib} (ix + \sqrt{1-x^2})^{-ia} + 1\right)}{2\pi} \right| + \left| \frac{\arg\left((ix + \sqrt{1-x^2})^{-ia} \left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)^{-ib}\right)}{\pi} \right|$$

$$\left( \csc^{-1} \left( \frac{2 (ix + \sqrt{1-x^2})^{-ia} \left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)^{-ib}}{\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)^{-2ib} (ix + \sqrt{1-x^2})^{-2ia} + 1} \right) - \frac{\pi}{2} \right) -$$

$$2i\pi \left( \frac{-\arg\left((ix + \sqrt{1-x^2})^{-ia}\right) - \arg\left(\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)^{-ib}\right) + \pi}{2\pi} \right) +$$

$$\left( \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right) + \left( \frac{\operatorname{Re}\left(b \log\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)\right) + \pi}{2\pi} \right)$$

**Involving  $\sec^{-1}(z)$**

01.12.16.0205.01

$$a \sin^{-1}(x) + b \sec^{-1}(y) =$$

$$\frac{\pi b}{2} - 2i\pi \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left(\sqrt{1-\frac{1}{y^2} + \frac{i}{y}}\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] +$$

$$\left[ \frac{\pi - \operatorname{Re}\left(b \log\left(\sqrt{1-\frac{1}{y^2} + \frac{i}{y}}\right)\right)}{2\pi} \right] + \log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(\sqrt{1-\frac{1}{y^2} + \frac{i}{y}}\right)^{ib}\right)$$

01.12.16.0206.01

$$a \sin^{-1}(x) + b \sec^{-1}(y) = \frac{\pi b}{2} - (-1)^{\left| \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(\sqrt{1-\frac{1}{y^2} + \frac{i}{y}}\right)^{ib} - 1\right)}{2\pi} + \frac{1}{2} - \frac{\arg\left(\left(\sqrt{1-\frac{1}{y^2} + \frac{i}{y}}\right)^{ib} \left(ix + \sqrt{1-x^2}\right)^{-ia} + 1\right)}{2\pi} \right|} \left[ \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(\sqrt{1-\frac{1}{y^2} + \frac{i}{y}}\right)^{ib}\right)}{\pi} \right]$$

$$\sec^{-1} \left( \frac{2 \left(ix + \sqrt{1-x^2}\right)^{-ia} \left(\sqrt{1-\frac{1}{y^2} + \frac{i}{y}}\right)^{ib}}{\left(\sqrt{1-\frac{1}{y^2} + \frac{i}{y}}\right)^{2ib} \left(ix + \sqrt{1-x^2}\right)^{-2ia} + 1} \right) i -$$

$$2i\pi \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left(\sqrt{1-\frac{1}{y^2} + \frac{i}{y}}\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] +$$

$$\left[ \frac{\pi - \operatorname{Re}\left(b \log\left(\sqrt{1-\frac{1}{y^2} + \frac{i}{y}}\right)\right)}{2\pi} \right] + \left( 1 - (-1)^{\left| \frac{\arg\left(\left(\sqrt{1-\frac{1}{y^2} + \frac{i}{y}}\right)^{ib} \left(ix + \sqrt{1-x^2}\right)^{-ia} + 1\right)}{2\pi} \right| - \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(\sqrt{1-\frac{1}{y^2} + \frac{i}{y}}\right)^{ib}\right)}{2\pi} \right) i\pi$$

Involving  $\sinh^{-1}(z)$

01.12.16.0207.01

$$a \sin^{-1}(x) + b \sinh^{-1}(y) =$$

$$\log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(y + \sqrt{y^2+1}\right)^b\right) - 2i\pi \left( \frac{-\arg\left(\left(y + \sqrt{y^2+1}\right)^b\right) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) + \pi}{2\pi} \right) +$$

$$\left( \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right) + \left( \frac{\pi - \operatorname{Im}\left(b \log\left(y + \sqrt{y^2+1}\right)\right)}{2\pi} \right)$$

01.12.16.0208.01

$$\begin{aligned}
 a \sin^{-1}(x) + b \sinh^{-1}(y) &= (-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\left(i x + \sqrt{1-x^2}\right)^{-i a} \left(y + \sqrt{y^2+1}\right)^b\right)}{\pi} \rfloor} \left| \frac{\arg\left(\left(i x + \sqrt{1-x^2}\right)^{-i a} \left(y + \sqrt{y^2+1}\right)^b\right)}{\pi} \right| \\
 &\quad - \left| \frac{\arg\left(i \left(i x + \sqrt{1-x^2}\right)^{-i a} \left(y + \sqrt{y^2+1}\right)^b - 1\right)}{2\pi} + \frac{1}{2} - \frac{\arg\left(\left(y + \sqrt{y^2+1}\right)^b (-i) \left(i x + \sqrt{1-x^2}\right)^{-i a} - 1\right)}{2\pi} \right| \\
 \sinh^{-1}\left(\frac{1}{2} \left(i x + \sqrt{1-x^2}\right)^{i a} \left(y + \sqrt{y^2+1}\right)^{-b} \left(\left(i x + \sqrt{1-x^2}\right)^{-2 i a} \left(y + \sqrt{y^2+1}\right)^{2 b} - 1\right)\right) &- \\
 \frac{1}{2} i (-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(i \left(i x + \sqrt{1-x^2}\right)^{-i a} \left(y + \sqrt{y^2+1}\right)^b - 1\right)}{2\pi} + \frac{1}{2} - \frac{\arg\left(\left(y + \sqrt{y^2+1}\right)^b (-i) \left(i x + \sqrt{1-x^2}\right)^{-i a} - 1\right)}{2\pi} \rfloor} &\left| \frac{\arg\left(i \left(i x + \sqrt{1-x^2}\right)^{-i a} \left(y + \sqrt{y^2+1}\right)^b\right)}{\pi} \right| \\
 \left( 1 - (-1)^{\lfloor \frac{1}{2} - \frac{\arg\left(\left(i x + \sqrt{1-x^2}\right)^{-i a} \left(y + \sqrt{y^2+1}\right)^b\right)}{\pi} \rfloor} \right) &+ \\
 (-1)^{\lfloor \frac{\arg\left(\left(i x + \sqrt{1-x^2}\right)^{-i a} \left(y + \sqrt{y^2+1}\right)^b\right)}{2\pi} + \frac{\arg\left(\left(i x + \sqrt{1-x^2}\right)^{-i a} \left(y + \sqrt{y^2+1}\right)^b - i\right)}{2\pi} + \frac{1}{2} \rfloor} &\left| \frac{\arg\left(i \left(i x + \sqrt{1-x^2}\right)^{-i a} \left(y + \sqrt{y^2+1}\right)^b - 1\right)}{2\pi} + \frac{1}{2} - \frac{\arg\left(\left(y + \sqrt{y^2+1}\right)^b (-i) \left(i x + \sqrt{1-x^2}\right)^{-i a} - 1\right)}{2\pi} \right| \\
 - & \\
 (-1)^{\lfloor \frac{\arg\left(\left(i x + \sqrt{1-x^2}\right)^{-i a} \left(y + \sqrt{y^2+1}\right)^b\right)}{2\pi} + \frac{\arg\left(\left(y + \sqrt{y^2+1}\right)^b \left(i x + \sqrt{1-x^2}\right)^{-i a} + i\right)}{2\pi} + \frac{1}{2} \rfloor} &\left| \frac{\arg\left(i \left(i x + \sqrt{1-x^2}\right)^{-i a} \left(y + \sqrt{y^2+1}\right)^b - 1\right)}{2\pi} + \frac{1}{2} - \frac{\arg\left(\left(y + \sqrt{y^2+1}\right)^b (-i) \left(i x + \sqrt{1-x^2}\right)^{-i a} - 1\right)}{2\pi} \right| \\
 \left( \pi - 2 i \pi \left( \frac{-\arg\left(\left(y + \sqrt{y^2+1}\right)^b\right) - \arg\left(\left(i x + \sqrt{1-x^2}\right)^{-i a}\right) + \pi}{2\pi} \right) \right) &+ \\
 \left( \frac{\operatorname{Re}\left(a \log\left(i x + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right) &+ \left( \frac{\pi - \operatorname{Im}\left(b \log\left(y + \sqrt{y^2+1}\right)\right)}{2\pi} \right)
 \end{aligned}$$

Involving  $\cosh^{-1}(z)$

01.12.16.0209.01

$$a \sin^{-1}(x) + b \cosh^{-1}(y) =$$

$$\log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(y + \sqrt{y-1} \sqrt{y+1}\right)^b\right) - 2i\pi \left[ \frac{-\arg\left(\left(y + \sqrt{y-1} \sqrt{y+1}\right)^b\right) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) + \pi}{2\pi} \right] +$$

$$\left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(b \log\left(y + \sqrt{y-1} \sqrt{y+1}\right)\right)}{2\pi} \right]$$

01.12.16.0210.01

$$a \sin^{-1}(x) + b \cosh^{-1}(y) = i\pi \left( 1 - (-1)^{\lfloor \frac{\arg\left(\left(y + \sqrt{y-1} \sqrt{y+1}\right)^b \left(ix + \sqrt{1-x^2}\right)^{-ia} + 1\right)}{2\pi} \rfloor - \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(y + \sqrt{y-1} \sqrt{y+1}\right)^b\right)}{2\pi} \right) +$$

$$(-1)^{\lfloor \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(y + \sqrt{y-1} \sqrt{y+1}\right)^b\right)}{\pi} - \frac{2 \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(y + \sqrt{y-1} \sqrt{y+1}\right)^b - 1\right)}{\pi} \rfloor \left| \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(y + \sqrt{y-1} \sqrt{y+1}\right)^b\right)}{\pi} \right| - \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(y + \sqrt{y-1} \sqrt{y+1}\right)^b\right)}{2\pi} \right)$$

$$\cosh^{-1}\left(\frac{1}{2} \left(ix + \sqrt{1-x^2}\right)^{ia} \left(y + \sqrt{y-1} \sqrt{y+1}\right)^{-b} \left(\left(y + \sqrt{y-1} \sqrt{y+1}\right)^{2b} \left(ix + \sqrt{1-x^2}\right)^{-2ia} + 1\right)\right) -$$

$$2i\pi \left[ \frac{-\arg\left(\left(y + \sqrt{y-1} \sqrt{y+1}\right)^b\right) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) + \pi}{2\pi} \right] +$$

$$\left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(b \log\left(y + \sqrt{y-1} \sqrt{y+1}\right)\right)}{2\pi} \right]$$

Involving  $\tanh^{-1}(z)$



01.12.16.0211.01

$$a \sin^{-1}(x) + b \tanh^{-1}(y) =$$

$$-2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left((1-y)^{-\frac{b}{2}}\right) + \pi}{2\pi} \right] + \left[ \frac{\frac{1}{2} \operatorname{Im}(b \log(1-y)) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] \right) -$$

$$2i\pi \left( \left[ \frac{-\arg((y+1)^{b/2}) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} (1-y)^{-\frac{b}{2}}\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \frac{1}{2} \operatorname{Im}(b \log(y+1))}{2\pi} \right] + \right.$$

$$\left. \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} (1-y)^{-\frac{b}{2}}\right)\right)}{2\pi} \right] \right) + \log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} (1-y)^{-\frac{b}{2}} (y+1)^{b/2}\right)$$

01.12.16.0212.01

$$a \sin^{-1}(x) + b \tanh^{-1}(y) = -2i\pi \left( \left[ \frac{-\arg((y+1)^{b/2}) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} (1-y)^{-\frac{b}{2}}\right) + \pi}{2\pi} \right] + \right.$$

$$\left. \left[ \frac{\pi - \frac{1}{2} \operatorname{Im}(b \log(y+1))}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} (1-y)^{-\frac{b}{2}}\right)\right)}{2\pi} \right] \right) -$$

$$2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left((1-y)^{-\frac{b}{2}}\right) + \pi}{2\pi} \right] + \left[ \frac{\frac{1}{2} \operatorname{Im}(b \log(1-y)) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] \right) +$$

$$i\pi \left( 1 - (-1)^{\lfloor \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} (1-y)^{-\frac{b}{2}} (y+1)^{b/2+1}\right)}{2\pi} + \frac{1}{2} \rfloor} \right) + 2 \tanh^{-1} \left( \frac{\left(ix + \sqrt{1-x^2}\right)^{-ia} (1-y)^{-\frac{b}{2}} (y+1)^{b/2} - 1}{\left(ix + \sqrt{1-x^2}\right)^{-ia} (1-y)^{-\frac{b}{2}} (y+1)^{b/2} + 1} \right)$$

Involving  $\coth^{-1}(z)$

01.12.16.0213.01

$$a \sin^{-1}(x) + b \coth^{-1}(y) =$$

$$-2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left(\left(1 - \frac{1}{y}\right)^{-\frac{b}{2}}\right) + \pi}{2\pi} \right] + \left[ \frac{\frac{1}{2} \operatorname{Im}\left(b \log\left(1 - \frac{1}{y}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] \right) -$$

$$2i\pi \left( \left[ \frac{-\arg\left(\left(1 + \frac{1}{y}\right)^{b/2}\right) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - \frac{1}{y}\right)^{-\frac{b}{2}}\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \frac{1}{2} \operatorname{Im}\left(b \log\left(1 + \frac{1}{y}\right)\right)}{2\pi} \right] \right) +$$

$$\left[ \frac{\pi - \operatorname{Im}\left(\log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - \frac{1}{y}\right)^{-\frac{b}{2}}\right)\right)}{2\pi} \right] + \log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - \frac{1}{y}\right)^{-\frac{b}{2}} \left(1 + \frac{1}{y}\right)^{b/2}\right)$$

01.12.16.0214.01

$$a \sin^{-1}(x) + b \coth^{-1}(y) = -2i\pi \left( \left[ \frac{-\arg\left(\left(1 + \frac{1}{y}\right)^{b/2}\right) - \arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - \frac{1}{y}\right)^{-\frac{b}{2}}\right) + \pi}{2\pi} \right] + \right.$$

$$\left. \left[ \frac{\pi - \frac{1}{2} \operatorname{Im}\left(b \log\left(1 + \frac{1}{y}\right)\right)}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(\log\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - \frac{1}{y}\right)^{-\frac{b}{2}}\right)\right)}{2\pi} \right] \right) -$$

$$2i\pi \left( \left[ \frac{-\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia}\right) - \arg\left(\left(1 - \frac{1}{y}\right)^{-\frac{b}{2}}\right) + \pi}{2\pi} \right] + \left[ \frac{\frac{1}{2} \operatorname{Im}\left(b \log\left(1 - \frac{1}{y}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\operatorname{Re}\left(a \log\left(ix + \sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] \right) +$$

$$i\pi \left( 1 - (-1)^{\left[ \frac{\arg\left(\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - \frac{1}{y}\right)^{-\frac{b}{2}} \left(1 + \frac{1}{y}\right)^{b/2} + 1\right)}{2\pi} + \frac{1}{2} \right]} \right) + 2 \coth^{-1} \left( \frac{\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - \frac{1}{y}\right)^{-\frac{b}{2}} \left(1 + \frac{1}{y}\right)^{b/2} + 1}{\left(ix + \sqrt{1-x^2}\right)^{-ia} \left(1 - \frac{1}{y}\right)^{-\frac{b}{2}} \left(1 + \frac{1}{y}\right)^{b/2} - 1} \right)$$

Involving  $\operatorname{csch}^{-1}(z)$

01.12.16.0215.01

$$a \sin^{-1}(x) + b \operatorname{csch}^{-1}(y) =$$

$$\log \left( (ix + \sqrt{1-x^2})^{-ia} \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^b \right) - 2i\pi \left( \frac{-\arg \left( (ix + \sqrt{1-x^2})^{-ia} \right) - \arg \left( \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^b \right) + \pi}{2\pi} \right) +$$

$$\left[ \frac{\operatorname{Re} \left( a \log \left( ix + \sqrt{1-x^2} \right) \right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im} \left( b \log \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right) \right)}{2\pi} \right]$$

01.12.16.0216.01

$$a \sin^{-1}(x) + b \operatorname{csch}^{-1}(y) = (-1) \left[ \frac{\frac{1}{2} \left| \frac{\arg \left( (ix + \sqrt{1-x^2})^{-ia} \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^b \right)}{\pi} \right|}{2\pi} - \frac{\arg \left( -i \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^b (ix + \sqrt{1-x^2})^{-ia} - 1 \right)}{2\pi} + \frac{1}{2} \frac{\arg \left( (ix + \sqrt{1-x^2})^{-ia} \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^b - 1 \right)}{2\pi} \right]$$

$$\operatorname{csch}^{-1} \left( \frac{2 \left( ix + \sqrt{1-x^2} \right)^{-ia} \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^b}{\left( ix + \sqrt{1-x^2} \right)^{-2ia} \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^{2b} - 1} \right) -$$

$$\frac{1}{2} i (-1) \left[ \frac{\arg \left( -i \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^b (ix + \sqrt{1-x^2})^{-ia} - 1 \right)}{2\pi} + \frac{1}{2} \frac{\arg \left( (ix + \sqrt{1-x^2})^{-ia} \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^b - 1 \right)}{2\pi} \right] + \left[ \frac{\arg \left( (ix + \sqrt{1-x^2})^{-ia} \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^b \right)}{\pi} \right]$$

$$\left( 1 - (-1) \left[ \frac{\frac{1}{2} \left| \frac{\arg \left( (ix + \sqrt{1-x^2})^{-ia} \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^b \right)}{\pi} \right|}{2\pi} \right] \right) +$$

$$(-1) \left[ \frac{\arg \left( (ix + \sqrt{1-x^2})^{-ia} \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^b \right)}{2\pi} + \frac{\arg \left( (ix + \sqrt{1-x^2})^{-ia} \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^b \right)}{2\pi} + \frac{1}{2} \right] + \left[ \frac{\arg \left( -i \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^b (ix + \sqrt{1-x^2})^{-ia} - 1 \right)}{2\pi} + \frac{1}{2} \frac{\arg \left( (ix + \sqrt{1-x^2})^{-ia} \left( \sqrt{1 + \frac{1}{y^2} + \frac{1}{y}} \right)^b - 1 \right)}{2\pi} \right]$$

-

$$\begin{aligned}
 & \left. \left[ \frac{\arg\left(\left(\sqrt{1+\frac{1}{y^2}+\frac{1}{y}}\right)^b (ix+\sqrt{1-x^2})^{-ia}\right)}{2\pi} + \frac{\arg\left((ix+\sqrt{1-x^2})^{-ia}\left(\sqrt{1+\frac{1}{y^2}+\frac{1}{y}}\right)^b\right)}{2\pi} + \frac{1}{2} \right] \right| \left[ \frac{\arg\left(-i\left(\sqrt{1+\frac{1}{y^2}+\frac{1}{y}}\right)^b (ix+\sqrt{1-x^2})^{-ia}\right)}{2\pi} + \frac{1}{2} - \frac{\arg\left(i(ix+\sqrt{1-x^2})^{-ia}\left(\sqrt{1+\frac{1}{y^2}+\frac{1}{y}}\right)^b\right)}{2\pi} \right. \\
 & \left. (-1) \right] \\
 & \left. \left[ \pi - 2i\pi \left[ \frac{-\arg\left((ix+\sqrt{1-x^2})^{-ia}\right) - \arg\left(\left(\sqrt{1+\frac{1}{y^2}+\frac{1}{y}}\right)^b\right) + \pi}{2\pi} \right] \right. \right. \\
 & \left. \left[ \frac{\operatorname{Re}\left(a \log\left(ix+\sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(b \log\left(\sqrt{1+\frac{1}{y^2}+\frac{1}{y}}\right)\right)}{2\pi} \right] \right]
 \end{aligned}$$

### Involving $\operatorname{sech}^{-1}(z)$

01.12.16.0217.01

$$\begin{aligned}
 a \sin^{-1}(x) + b \operatorname{sech}^{-1}(y) &= \log\left((ix+\sqrt{1-x^2})^{-ia}\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)^b\right) - \\
 & 2i\pi \left[ \frac{-\arg\left((ix+\sqrt{1-x^2})^{-ia}\right) - \arg\left(\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)^b\right) + \pi}{2\pi} \right] + \\
 & \left[ \frac{\operatorname{Re}\left(a \log\left(ix+\sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(b \log\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)\right)}{2\pi} \right]
 \end{aligned}$$

01.12.16.0218.01

$$\begin{aligned}
 a \sin^{-1}(x) + b \operatorname{sech}^{-1}(y) = i\pi & \left( 1 - (-1) \left[ \frac{\arg\left(\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)^b (ix+\sqrt{1-x^2})^{-ia} + 1\right)}{2\pi} \right] - \left[ \frac{\arg\left((ix+\sqrt{1-x^2})^{-ia} \left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)^b\right)}{2\pi} \right] \right) + \\
 & (-1) \left[ \frac{\arg\left((ix+\sqrt{1-x^2})^{-ia} \left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)^b\right)}{\pi} - \frac{2\arg\left((ix+\sqrt{1-x^2})^{-ia} \left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)^b - 1\right)}{\pi} \right] + \left[ \frac{\arg\left((ix+\sqrt{1-x^2})^{-ia} \left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)^b\right)}{\pi} \right] - \left[ \frac{\arg\left((ix+\sqrt{1-x^2})^{-ia} \left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)^b\right)}{2\pi} \right] \\
 & \operatorname{sech}^{-1} \left( \frac{2(ix+\sqrt{1-x^2})^{-ia} \left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)^b}{\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)^{2b} (ix+\sqrt{1-x^2})^{-2ia} + 1} \right) - \\
 & 2i\pi \left( \frac{-\arg\left((ix+\sqrt{1-x^2})^{-ia}\right) - \arg\left(\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)^b\right) + \pi}{2\pi} \right) + \\
 & \left[ \frac{\operatorname{Re}\left(a \log\left(ix+\sqrt{1-x^2}\right)\right) + \pi}{2\pi} \right] + \left[ \frac{\pi - \operatorname{Im}\left(b \log\left(\sqrt{\frac{1}{y}-1}\sqrt{1+\frac{1}{y}+\frac{1}{y}}\right)\right)}{2\pi} \right]
 \end{aligned}$$

## Identities

### Functional identities

01.12.17.0001.01

$$\sin^4(w(z_1) + w(z_2)) + 2(2z_2^2 z_1^2 - z_1^2 - z_2^2) \sin^2(w(z_1) + w(z_2)) + (z_1^2 - z_2^2)^2 = 0 /; w(z) = \sin^{-1}(z)$$

## Complex characteristics

### Real part

01.12.19.0001.01

$$\operatorname{Re}(\sin^{-1}(x + iy)) = \sin^{-1}\left(\frac{1}{2}\sqrt{(x+1)^2 + y^2} - \frac{1}{2}\sqrt{(x-1)^2 + y^2}\right) /; x + iy \notin (-\infty, -1) \wedge x + iy \notin (1, \infty)$$

01.12.19.0002.01

$$\operatorname{Re}(\sin^{-1}(x + i y)) = \tan^{-1} \left( \sqrt[4]{4 x^2 y^2 + (-x^2 + y^2 + 1)^2} \cos \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2 x y) \right) - y, \right. \\ \left. \sin \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2 x y) \right) \sqrt[4]{4 x^2 y^2 + (-x^2 + y^2 + 1)^2} + x \right)$$

### Imaginary part

01.12.19.0003.01

$$\operatorname{Im}(\sin^{-1}(x + i y)) = \operatorname{sgn}(y) \log \left( X + \sqrt{X^2 - 1} \right) /;$$

$$X = \frac{1}{2} \sqrt{(x-1)^2 + y^2} + \frac{1}{2} \sqrt{(x+1)^2 + y^2} \wedge x + i y \notin (-\infty, -1) \wedge x + i y \notin (1, \infty)$$

01.12.19.0004.01

$$\operatorname{Im}(\sin^{-1}(x + i y)) = -\log \left( \sqrt{\left( \left( \sqrt[4]{4 x^2 y^2 + (-x^2 + y^2 + 1)^2} \cos \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2 x y) \right) - y \right)^2 + \right. \right. \\ \left. \left. \left( \sin \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2 x y) \right) \sqrt[4]{4 x^2 y^2 + (-x^2 + y^2 + 1)^2} + x \right)^2 \right) \right)$$

### Absolute value

01.12.19.0005.01

$$|\sin^{-1}(x + i y)| = \sqrt{\left( \tan^{-1} \left( \sqrt[4]{x^4 + 2 (y^2 - 1) x^2 + (y^2 + 1)^2} \cos \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2 x y) \right) - y, \right. \right. \\ \left. \left. \sin \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2 x y) \right) \sqrt[4]{x^4 + 2 (y^2 - 1) x^2 + (y^2 + 1)^2} + x \right)^2 + \right. \\ \left. \log^2 \left( \sqrt{\left( \left( y - \sqrt[4]{x^4 + 2 (y^2 - 1) x^2 + (y^2 + 1)^2} \cos \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2 x y) \right) \right)^2 + \right. \right. \right. \\ \left. \left. \left. \left( \sin \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2 x y) \right) \sqrt[4]{x^4 + 2 (y^2 - 1) x^2 + (y^2 + 1)^2} + x \right)^2 \right) \right) \right)$$

### Argument

01.12.19.0006.01

$$\begin{aligned} \arg(\sin^{-1}(x + i y)) &= \tan^{-1} \left( \tan^{-1} \left( \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} \cos\left(\frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy)\right) \right) - y, \right. \\ &\quad \left. \sin\left(\frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy)\right) \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} + x \right), \\ &= -\log \left[ \sqrt{\left( \left( y - \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} \cos\left(\frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy)\right) \right)^2 + \right. \right. \\ &\quad \left. \left. \left( \sin\left(\frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy)\right) \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} + x \right)^2 \right) \right] \end{aligned}$$

### Conjugate value

01.12.19.0007.01

$$\begin{aligned} \overline{\sin^{-1}(x + i y)} &= \tan^{-1} \left( \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} \cos\left(\frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy)\right) - y, \right. \\ &\quad \left. \sin\left(\frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy)\right) \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} + x \right) + \\ &= i \log \left[ \sqrt{\left( \left( y - \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} \cos\left(\frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy)\right) \right)^2 + \right. \right. \\ &\quad \left. \left. \left( \sin\left(\frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy)\right) \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} + x \right)^2 \right) \right] \end{aligned}$$

### Signum value

01.12.19.0008.01

$$\begin{aligned} \operatorname{sgn}(\sin^{-1}(x + iy)) &= \left( \tan^{-1} \left( \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} \cos \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy) \right) - y, \right. \right. \\ &\quad \left. \sin \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy) \right) \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} + x \right) - \\ &\quad i \log \left( \sqrt[4]{ \left( \left( y - \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} \cos \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy) \right) \right)^2 + \right. \right. \\ &\quad \left. \left. \left( \sin \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy) \right) \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} + x \right)^2 \right) \right) / \\ &\quad \left( \sqrt[4]{ \left( \tan^{-1} \left( \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} \cos \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy) \right) - y, \right. \right. \right. \\ &\quad \left. \left. \left. \sin \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy) \right) \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} + x \right)^2 + \right. \right. \\ &\quad \left. \left. \log^2 \left( \sqrt[4]{ \left( \left( y - \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} \cos \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy) \right) \right)^2 + \right. \right. \right. \right. \\ &\quad \left. \left. \left. \left. \left. \sin \left( \frac{1}{2} \tan^{-1}(-x^2 + y^2 + 1, -2xy) \right) \sqrt[4]{x^4 + 2(y^2 - 1)x^2 + (y^2 + 1)^2} + x \right)^2 \right) \right) \right) \right) \right) \end{aligned}$$

## Differentiation

### Low-order differentiation

01.12.20.0001.01

$$\frac{\partial \sin^{-1}(z)}{\partial z} = \frac{1}{\sqrt{1 - z^2}}$$

01.12.20.0002.01

$$\frac{\partial^2 \sin^{-1}(z)}{\partial z^2} = \frac{z}{(1 - z^2)^{3/2}}$$

### Symbolic differentiation

01.12.20.0005.01

$$\frac{\partial^n \sin^{-1}(z)}{\partial z^n} = \sin^{-1}(z) \delta_n + \frac{(-1)^{n-1}}{(1 - z^2)^{n-\frac{1}{2}}} \sum_{k=0}^{n-1} \frac{(1-n)_k \left(\frac{1}{2}\right)_k 2^{2k-n+1} z^{2k-n+1} (z^2 - 1)^{-k+n-1}}{(2k - n + 1)!} ; n \in \mathbb{N}$$



01.12.20.0003.02

$$\frac{\partial^n \sin^{-1}(z)}{\partial z^n} = 2^{n-1} \sqrt{\pi} z^{1-n} {}_3\tilde{F}_2\left(\frac{1}{2}, \frac{1}{2}, 1; 1 - \frac{n}{2}, \frac{3-n}{2}; z^2\right); n \in \mathbb{N}$$

01.12.20.0006.01

$$\frac{\partial^n \sin^{-1}(z)}{\partial z^n} = \frac{(-i)^{n-1} (n-1)!}{(1-z^2)^{n/2}} P_{n-1}\left(\frac{iz}{\sqrt{1-z^2}}\right); n \in \mathbb{N}^+$$

Brychkov Yu.A. (2006)

01.12.20.0007.01

$$\frac{\partial^n \sin^{-1}(z)}{\partial z^n} = (-1)^{n-1} 2^{1-n} (1-z^2)^{\frac{1}{2}-n} (n-1)! C_{n-1}^{1-n}(z); n \in \mathbb{Z} \wedge n \geq 2$$

Brychkov Yu.A. (2006)

## Fractional integro-differentiation

01.12.20.0004.01

$$\frac{\partial^\alpha \sin^{-1}(z)}{\partial z^\alpha} = 2^{\alpha-1} \sqrt{\pi} z^{1-\alpha} {}_3\tilde{F}_2\left(\frac{1}{2}, \frac{1}{2}, 1; 1 - \frac{\alpha}{2}, \frac{3-\alpha}{2}; z^2\right)$$

## Integration

### Indefinite integration

#### For the direct function itself

01.12.21.0001.01

$$\int \sin^{-1}(z) dz = z \sin^{-1}(z) + \sqrt{1-z^2}$$

01.12.21.0002.01

$$\int \frac{\sin^{-1}(z)}{z} dz = \sin^{-1}(z) \log(1 - e^{2i \sin^{-1}(z)}) - \frac{1}{2} i \left( \sin^{-1}(z)^2 + \text{Li}_2(e^{2i \sin^{-1}(z)}) \right)$$

01.12.21.0003.01

$$\int \frac{\sin^{-1}(z)}{\sqrt{z}} dz = 2 \sqrt{z} \left( \sin^{-1}(z) - \frac{\sqrt{z+1}}{\sqrt{\frac{z}{2z-2} \sqrt{1-z^2}}} \left( 2E\left(\sin^{-1}(\sqrt{z+1}) \middle| \frac{1}{2}\right) - F\left(\sin^{-1}(\sqrt{z+1}) \middle| \frac{1}{2}\right) \right) \right)$$

01.12.21.0004.01

$$\int z^{\alpha-1} \sin^{-1}(z) dz = \frac{z^\alpha \sin^{-1}(z)}{\alpha} - \frac{z^{\alpha+1}}{\alpha(\alpha+1)} {}_2F_1\left(\frac{\alpha+1}{2}, \frac{1}{2}; \frac{\alpha+3}{2}; z^2\right)$$

01.12.21.0005.01

$$\int \sin^{-1}(az+b) dz = \frac{b}{a} \sin^{-1}(az+b) + z \sin^{-1}(az+b) + \frac{\sqrt{1-(az+b)^2}}{a}$$

01.12.21.0006.01

$$\int z \sin^{-1}(az+b) dz = \frac{1}{4a^2} \left( \sqrt{1-(az+b)^2} (az-3b) + (2a^2z^2 - 2b^2 - 1) \sin^{-1}(az+b) \right)$$

01.12.21.0007.01

$$\int \frac{\sin^{-1}(az+b)}{z} dz = \frac{1}{8} i (\pi - 2 \sin^{-1}(b+az))^2 + \frac{1}{2} \log(az) (\pi - 2 \sin^{-1}(b+az)) + 4i \sin^{-1} \left( \frac{\sqrt{1-b}}{\sqrt{2}} \right) \tan^{-1} \left( \frac{b+1}{\sqrt{b^2-1}} \tan \left( \frac{1}{4} (\pi - 2 \sin^{-1}(b+az)) \right) \right) - \frac{1}{2} \left( -4 \sin^{-1} \left( \frac{\sqrt{1-b}}{\sqrt{2}} \right) - 2 \sin^{-1}(b+az) + \pi \right) \log \left( 1 + i \left( \sqrt{b^2-1} - b \right) e^{-i \sin^{-1}(b+az)} \right) - \frac{1}{2} \left( 4 \sin^{-1} \left( \frac{\sqrt{1-b}}{\sqrt{2}} \right) - 2 \sin^{-1}(b+az) + \pi \right) \log \left( 1 - i \left( b + \sqrt{b^2-1} \right) e^{-i \sin^{-1}(b+az)} \right) + \sin^{-1}(b+az) \log(az) + i \left( \text{Li}_2 \left( -i \left( \sqrt{b^2-1} - b \right) e^{-i \sin^{-1}(b+az)} \right) + \text{Li}_2 \left( i \left( b + \sqrt{b^2-1} \right) e^{-i \sin^{-1}(b+az)} \right) \right)$$

01.12.21.0008.01

$$\int \frac{1}{\sin^{-1}(z)} dz = \text{Ci}(\sin^{-1}(z))$$

01.12.21.0009.01

$$\int \sin^{-1}(z)^n dz = -\frac{i}{2} \sin^{-1}(z)^n \left( \frac{\Gamma(n+1, -i \sin^{-1}(z))}{(-i \sin^{-1}(z))^n} - \frac{\Gamma(n+1, i \sin^{-1}(z))}{(i \sin^{-1}(z))^n} \right)$$

01.12.21.0010.01

$$\int z \sin^{-1}(z)^n dz = -2^{-n-3} \sin^{-1}(z)^n \left( \frac{\Gamma(n+1, -2i \sin^{-1}(z))}{(-i \sin^{-1}(z))^n} + \frac{\Gamma(n+1, 2i \sin^{-1}(z))}{(i \sin^{-1}(z))^n} \right)$$

## Definite integration

### For the direct function itself

01.12.21.0011.01

$$\int_0^1 \sin^{-1}(t) dt = \frac{\pi}{2} - 1$$

01.12.21.0012.01

$$\int_0^1 \frac{\sin^{-1}(t)}{t} dt = \frac{1}{2} \pi \log(2)$$

01.12.21.0013.01

$$\int_0^1 t^a \sin^{-1}(t) dt = \frac{\pi}{2a+2} - \frac{\sqrt{\pi} \Gamma\left(\frac{a+2}{2}\right)}{(a+1)^2 \Gamma\left(\frac{a+1}{2}\right)} ; \text{Re}(a) > -2$$

### Involving the direct function

01.12.21.0014.01

$$\int_0^{\frac{\pi}{2}} \sin^{-1}(z \sin(t)) dt = \frac{1}{4} z \Phi\left(z^2, 2, \frac{1}{2}\right)$$

01.12.21.0015.01

$$\int_0^1 \log(t) \sin^{-1}(t) dt = -\log(2) - \frac{\pi}{2} + 2$$

## Representations through more general functions

### Through hypergeometric functions

#### Involving ${}_2F_1$

01.12.26.0001.01

$$\sin^{-1}(z) = z {}_2F_1\left(\frac{1}{2}, \frac{1}{2}; \frac{3}{2}; z^2\right)$$

01.12.26.0002.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \sqrt{2} \sqrt{1-z} {}_2F_1\left(\frac{1}{2}, \frac{1}{2}; \frac{3}{2}; \frac{1-z}{2}\right)$$

01.12.26.0003.01

$$\sin^{-1}(z) = \sqrt{2} \sqrt{z+1} {}_2F_1\left(\frac{1}{2}, \frac{1}{2}; \frac{3}{2}; \frac{z+1}{2}\right) - \frac{\pi}{2}$$

#### Involving ${}_pF_q$

01.12.26.0004.01

$$\sin^{-1}(z) = \frac{z}{2\sqrt{-z^2}} \left( \log(-4z^2) - \frac{1}{2z^2} {}_3F_2\left(\frac{3}{2}, 1, 1; 2, 2; \frac{1}{z^2}\right) \right); z \notin (-1, 1)$$

01.12.26.0005.01

$$\sin^{-1}(z)^2 = z^2 {}_3F_2\left(1, 1, 1; \frac{3}{2}, 2; z^2\right)$$

### Through Meijer G

#### Classical cases for the direct function itself

01.12.26.0006.01

$$\sin^{-1}(z) = -\frac{1}{2z\sqrt{\pi}} G_{2,2}^{1,2}\left(-z^2 \left| \begin{matrix} \frac{3}{2}, \frac{3}{2} \\ 1, \frac{1}{2} \end{matrix} \right.\right)$$

01.12.26.0007.01

$$\sin^{-1}(z) = -\frac{\sqrt{-z^2}}{2z\sqrt{\pi}} G_{2,2}^{1,2}\left(-z^2 \left| \begin{matrix} 1, 1 \\ \frac{1}{2}, 0 \end{matrix} \right.\right)$$

01.12.26.0008.01

$$\sin^{-1}(z) = \frac{i}{2\sqrt{\pi}} G_{2,2}^{1,2}\left(-z^2 \left| \begin{matrix} 1, 1 \\ \frac{1}{2}, 0 \end{matrix} \right.\right); 0 < \arg(z) \leq \pi$$

01.12.26.0009.01

$$\sin^{-1}(\sqrt{z}) = \frac{\sqrt{-z^2}}{2\sqrt{\pi}} G_{2,2}^{1,2} \left( -z \left| \begin{matrix} 0, 0 \\ -\frac{1}{2}, -1 \end{matrix} \right. \right)$$

01.12.26.0034.01

$$\sin^{-1}(\sqrt{z}) - \sum_{k=0}^n \frac{\left(\frac{1}{2}\right)_k z^{k+\frac{1}{2}}}{(2k+1)k!} = \frac{(-1)^n \sqrt{-z}}{2\sqrt{\pi}\sqrt{z}} G_{3,3}^{1,3} \left( -z \left| \begin{matrix} 1, 1, n+\frac{3}{2} \\ n+\frac{3}{2}, 0, \frac{1}{2} \end{matrix} \right. \right); n \in \mathbb{N}$$

01.12.26.0035.01

$$\sin^{-1}(\sqrt{z}) - \frac{\sqrt{z} \log(-4z)}{2\sqrt{-z}} + \frac{\sqrt{z}}{2\sqrt{-z}} \sum_{k=1}^n \frac{\left(\frac{1}{2}\right)_k z^{-k}}{kk!} = \frac{(-1)^n \sqrt{z}}{2\sqrt{\pi}\sqrt{-z}} G_{3,3}^{1,3} \left( -\frac{1}{z} \left| \begin{matrix} \frac{1}{2}, 1, n+1 \\ n+1, 0, 0 \end{matrix} \right. \right); n \in \mathbb{N}$$

**Classical cases involving algebraic functions**

01.12.26.0010.01

$$\frac{\sin^{-1}(\sqrt{z})}{\sqrt{z-1}} = \frac{\sqrt{\pi}}{2} G_{2,2}^{1,2} \left( -z \left| \begin{matrix} \frac{1}{2}, \frac{1}{2} \\ \frac{1}{2}, 0 \end{matrix} \right. \right); z \notin (0, 1)$$

01.12.26.0011.01

$$\frac{1}{\sqrt{z-1}} \sin^{-1} \left( \frac{1}{\sqrt{z}} \right) = -\frac{\sqrt{\pi}}{2} G_{2,2}^{2,1} \left( -z \left| \begin{matrix} 0, \frac{1}{2} \\ 0, 0 \end{matrix} \right. \right)$$

**Classical cases involving unit step  $\theta$**

01.12.26.0012.01

$$\theta(1-|z|) \sin^{-1}(\sqrt{z}) = \frac{\pi}{2} G_{1,1}^{1,0} \left( z \left| \begin{matrix} 1 \\ 0 \end{matrix} \right. \right) - \frac{\sqrt{\pi}}{2} G_{2,2}^{2,0} \left( z \left| \begin{matrix} 1, 1 \\ 0, \frac{1}{2} \end{matrix} \right. \right); z \notin (-1, 0)$$

01.12.26.0013.01

$$\theta(|z|-1) \sin^{-1} \left( \frac{1}{\sqrt{z}} \right) = \frac{1}{2} \pi G_{1,1}^{0,1} \left( z \left| \begin{matrix} 1 \\ 0 \end{matrix} \right. \right) - \frac{1}{2} \sqrt{\pi} G_{2,2}^{0,2} \left( z \left| \begin{matrix} 1, \frac{1}{2} \\ 0, 0 \end{matrix} \right. \right)$$

**Classical cases for powers of  $\sin^{-1}$**

01.12.26.0014.01

$$\sin^{-1}(\sqrt{z})^2 = -\frac{\sqrt{\pi}}{2} G_{3,3}^{1,3} \left( -z \left| \begin{matrix} 1, 1, 1 \\ 1, 0, \frac{1}{2} \end{matrix} \right. \right)$$

**Generalized cases for the direct function itself**

01.12.26.0015.01

$$\sin^{-1}(z) = -\frac{1}{2z\sqrt{\pi}} G_{2,2}^{1,2} \left( \sqrt{-z^2}, \frac{1}{2} \left| \begin{matrix} \frac{3}{2}, \frac{3}{2} \\ 1, \frac{1}{2} \end{matrix} \right. \right)$$

01.12.26.0016.01

$$\sin^{-1}(z) = -\frac{i}{2\sqrt{\pi}} G_{2,2}^{1,2} \left( iz, \frac{1}{2} \left| \begin{matrix} 1, 1 \\ \frac{1}{2}, 0 \end{matrix} \right. \right)$$

01.12.26.0036.01

$$\sin^{-1}(z) - \sum_{k=0}^n \frac{\left(\frac{1}{2}\right)_k z^{2k+1}}{(2k+1)k!} = \frac{(-1)^{n+\frac{1}{2}}}{2\sqrt{\pi}} G_{3,3}^{1,3}\left(i z, \frac{1}{2} \left| \begin{matrix} 1, 1, n + \frac{3}{2} \\ n + \frac{3}{2}, 0, \frac{1}{2} \end{matrix} \right. \right); n \in \mathbb{N}$$

01.12.26.0037.01

$$\sin^{-1}(z) - \frac{z \log(-4z^2)}{2\sqrt{-z^2}} + \frac{z}{2\sqrt{-z^2}} \sum_{k=1}^n \frac{\left(\frac{1}{2}\right)_k z^{-2k}}{k k!} = \frac{(-1)^n z}{2\sqrt{\pi} \sqrt{-z^2}} G_{3,3}^{1,3}\left(-\frac{i}{z}, \frac{1}{2} \left| \begin{matrix} \frac{1}{2}, 1, n+1 \\ n+1, 0, 0 \end{matrix} \right. \right); n \in \mathbb{N}$$

### Generalized cases involving algebraic functions

01.12.26.0017.01

$$\frac{\sin^{-1}(z)}{\sqrt{1-z^2}} = -\frac{i\sqrt{\pi}}{2} G_{2,2}^{1,2}\left(i z, \frac{1}{2} \left| \begin{matrix} \frac{1}{2}, \frac{1}{2} \\ \frac{1}{2}, 0 \end{matrix} \right. \right)$$

01.12.26.0018.01

$$\frac{\sin^{-1}\left(\frac{1}{z}\right)}{\sqrt{z^2-1}} = -\frac{1}{2}\sqrt{\pi} G_{2,2}^{2,1}\left(i z, \frac{1}{2} \left| \begin{matrix} 0, \frac{1}{2} \\ 0, 0 \end{matrix} \right. \right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.26.0019.01

$$\frac{1}{\sqrt{1-\frac{1}{z^2}}} \sin^{-1}\left(\frac{1}{z}\right) = \frac{i\sqrt{\pi}}{2} G_{2,2}^{2,1}\left(i z, \frac{1}{2} \left| \begin{matrix} \frac{1}{2}, 1 \\ \frac{1}{2}, \frac{1}{2} \end{matrix} \right. \right)$$

### Generalized cases involving unit step $\theta$

01.12.26.0020.01

$$\theta(1-|z|) \sin^{-1}(z) = \frac{1}{2}\pi G_{1,1}^{1,0}\left(z, \frac{1}{2} \left| \begin{matrix} 1 \\ 0 \end{matrix} \right. \right) - \frac{1}{2}\sqrt{\pi} G_{2,2}^{2,0}\left(z, \frac{1}{2} \left| \begin{matrix} 1, 1 \\ 0, \frac{1}{2} \end{matrix} \right. \right)$$

01.12.26.0021.01

$$\theta(|z|-1) \sin^{-1}\left(\frac{1}{z}\right) = \frac{1}{2}\pi G_{1,1}^{0,1}\left(z, \frac{1}{2} \left| \begin{matrix} 1 \\ 0 \end{matrix} \right. \right) - \frac{1}{2}\sqrt{\pi} G_{2,2}^{0,2}\left(z, \frac{1}{2} \left| \begin{matrix} 1, \frac{1}{2} \\ 0, 0 \end{matrix} \right. \right)$$

### Generalized cases for powers of $\sin^{-1}$

01.12.26.0022.01

$$\sin^{-1}(z)^2 = -\frac{1}{2}\sqrt{\pi} G_{3,3}^{1,3}\left(i z, \frac{1}{2} \left| \begin{matrix} 1, 1, 1 \\ 1, 0, \frac{1}{2} \end{matrix} \right. \right)$$

## Through other functions

### Involving inverse Jacobi functions

01.12.26.0023.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \text{cd}^{-1}(z | 0)$$

01.12.26.0024.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \text{cn}^{-1}(z | 0)$$

01.12.26.0025.01

$$\sin^{-1}(z) = i \operatorname{cs}^{-1}\left(\frac{i}{z} \mid 1\right)$$

01.12.26.0026.01

$$\sin^{-1}(z) = \operatorname{ds}^{-1}\left(\frac{1}{z} \mid 0\right)$$

01.12.26.0027.01

$$\sin^{-1}(z) = i \operatorname{ds}^{-1}\left(\frac{i}{z} \mid 1\right)$$

01.12.26.0028.01

$$\sin^{-1}(z) = \operatorname{ns}^{-1}\left(\frac{1}{z} \mid 0\right)$$

01.12.26.0029.01

$$\sin^{-1}(z) = -i \operatorname{sc}^{-1}(i z \mid 1)$$

01.12.26.0030.01

$$\sin^{-1}(z) = -i \operatorname{sd}^{-1}(i z \mid 1)$$

01.12.26.0031.01

$$\sin^{-1}(z) = \operatorname{sd}^{-1}(z \mid 0)$$

01.12.26.0032.01

$$\sin^{-1}(z) = \operatorname{sn}^{-1}(z \mid 0)$$

### Involving some hypergeometric-type functions

01.12.26.0033.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{2z} \operatorname{B}_{z^2}\left(\frac{1}{2}, \frac{1}{2}\right)$$

## Representations through equivalent functions

### With inverse function

#### Involving $\sin^{-1}(\sin(z))$

01.12.27.0001.01

$$\sin^{-1}(\sin(z)) = z /; -\frac{\pi}{2} < \operatorname{Re}(z) < \frac{\pi}{2} \vee \left( \operatorname{Re}(z) = -\frac{\pi}{2} \wedge \operatorname{Im}(z) \geq 0 \right) \vee \left( \operatorname{Re}(z) = \frac{\pi}{2} \wedge \operatorname{Im}(z) \leq 0 \right)$$

01.12.27.0002.01

$$\sin^{-1}(\sin(z)) = -\pi - z /; -\frac{3\pi}{2} < \operatorname{Re}[z] < -\frac{\pi}{2} \vee \left( \operatorname{Re}(z) = -\frac{3\pi}{2} \wedge \operatorname{Im}(z) \geq 0 \right) \vee \left( \operatorname{Re}(z) = -\frac{\pi}{2} \wedge \operatorname{Im}(z) \leq 0 \right)$$

01.12.27.0003.01

$$\sin^{-1}(\sin(z)) = \pi - z /; \frac{\pi}{2} < \operatorname{Re}(z) < \frac{3\pi}{2} \vee \left( \operatorname{Re}(z) = \frac{\pi}{2} \wedge \operatorname{Im}(z) \geq 0 \right) \vee \left( \operatorname{Re}(z) = \frac{3\pi}{2} \wedge \operatorname{Im}(z) \leq 0 \right)$$

01.12.27.0004.01

$$\sin^{-1}(\sin(z)) = (-1)^k (z - \pi k) /; \left( k\pi - \frac{\pi}{2} < \operatorname{Re}(z) < k\pi + \frac{\pi}{2} \vee \left( \operatorname{Re}(z) = k\pi - \frac{\pi}{2} \wedge \operatorname{Im}(z) \geq 0 \right) \vee \left( \operatorname{Re}(z) = k\pi + \frac{\pi}{2} \wedge \operatorname{Im}(z) \leq 0 \right) \right) \wedge k \in \mathbb{Z}$$

01.12.27.0005.02

$$\sin^{-1}(\sin(z)) = (-1)^{\lfloor \frac{\operatorname{Re}(z)}{\pi} - \frac{1}{2} \rfloor} \left( \left( 1 + (-1)^{\lfloor \frac{\operatorname{Re}(z)}{\pi} + \frac{1}{2} \rfloor + \lfloor -\frac{\operatorname{Re}(z)}{\pi} - \frac{1}{2} \rfloor \right) \theta(-\operatorname{Im}(z)) - 1 \right) \left( z - \pi \left\lfloor \frac{\operatorname{Re}(z)}{\pi} + \frac{1}{2} \right\rfloor + \frac{1}{2} \left( 1 + (-1)^{\lfloor \frac{\operatorname{Re}(z)}{\pi} + \frac{1}{2} \rfloor + \lfloor -\frac{\operatorname{Re}(z)}{\pi} - \frac{1}{2} \rfloor \right) \pi \theta(-\operatorname{Im}(z)) \right)$$

01.12.27.2299.01

$$\sin^{-1}(\sin(z)) = \begin{cases} (-1)^{\lfloor \frac{2\operatorname{Re}(z)+\pi}{2\pi} \rfloor} \left( \pi \left\lfloor \frac{2\operatorname{Re}(z)-\pi}{2\pi} \right\rfloor - z \right) & \frac{2\operatorname{Re}(z)+\pi}{2\pi} \in \mathbb{Z} \wedge \operatorname{Im}(z) \leq 0 \\ (-1)^{\lfloor \frac{2\operatorname{Re}(z)+\pi}{2\pi} \rfloor} \left( z - \pi \left\lfloor \frac{2\operatorname{Re}(z)+\pi}{2\pi} \right\rfloor \right) & \text{True} \end{cases}$$

01.12.27.2300.01

$$\sin^{-1}(\sin(z)) = \csc^{-1}(\csc(z))$$

### Involving $\sin(\sin^{-1}(z))$

01.12.27.0006.01

$$\sin(\sin^{-1}(z)) = z$$

### Involving $\sin^{-1}(\cos(z))$

01.12.27.2301.01

$$\sin^{-1}(\cos(z)) = \frac{\pi}{2} - z /; 0 < \operatorname{Re}(z) < \pi \vee (\operatorname{Re}(z) = \pi \wedge \operatorname{Im}(z) \leq 0) \vee (\operatorname{Re}(z) = 0 \wedge \operatorname{Im}(z) \geq 0)$$

01.12.27.2302.01

$$\sin^{-1}(\cos(z)) = z + \frac{\pi}{2} /; -\pi < \operatorname{Re}(z) < 0 \vee (\operatorname{Re}(z) = 0 \wedge \operatorname{Im}(z) \leq 0) \vee (\operatorname{Re}(z) = -\pi \wedge \operatorname{Im}(z) \geq 0)$$

01.12.27.2303.01

$$\sin^{-1}(\cos(z)) = (-1)^k \left( \frac{\pi}{2} + \pi k - z \right) /; (k\pi < \operatorname{Re}(z) < \pi(k+1) \vee (\operatorname{Re}(z) = \pi(k+1) \wedge \operatorname{Im}(z) \leq 0) \vee (\operatorname{Re}(z) = k\pi \wedge \operatorname{Im}(z) \geq 0)) \wedge k \in \mathbb{Z}$$

01.12.27.2304.01

$$\sin^{-1}(\cos(z)) = (-1)^{\lfloor -\frac{\operatorname{Re}(z)}{\pi} \rfloor} \left( \left( 1 + (-1)^{\lfloor \frac{\operatorname{Re}(z)}{\pi} \rfloor + \lfloor -\frac{\operatorname{Re}(z)}{\pi} \rfloor \right) \theta(\operatorname{Im}(z)) - 1 \right) \left( -z - \pi \left\lfloor -\frac{\operatorname{Re}(z)}{\pi} \right\rfloor + \frac{1}{2} \left( 1 + (-1)^{\lfloor \frac{\operatorname{Re}(z)}{\pi} \rfloor + \lfloor -\frac{\operatorname{Re}(z)}{\pi} \rfloor \right) \pi \theta(\operatorname{Im}(z)) - \frac{\pi}{2} \right)$$

01.12.27.2305.01

$$\sin^{-1}(\cos(z)) = \begin{cases} (-1)^{\lfloor \frac{\operatorname{Re}(z)}{\pi} \rfloor} \left( z - \pi \left\lfloor \frac{\operatorname{Re}(z)}{\pi} \right\rfloor + \frac{\pi}{2} \right) & \frac{\operatorname{Re}(z)}{\pi} \in \mathbb{Z} \wedge \operatorname{Im}(z) \leq 0 \\ (-1)^{\lfloor \frac{\operatorname{Re}(z)}{\pi} \rfloor} \left( -z + \pi \left\lfloor \frac{\operatorname{Re}(z)}{\pi} \right\rfloor + \frac{\pi}{2} \right) & \text{True} \end{cases}$$

01.12.27.2306.01

$$\sin^{-1}(\cos(z)) = \csc^{-1}(\sec(z))$$

## With related functions

### Involving log

01.12.27.0007.01

$$\sin^{-1}(z) = -i \log\left(iz + \sqrt{1-z^2}\right)$$

01.12.27.0008.01

$$\sin^{-1}(z) = -i \log\left(iz + \sqrt{1-z} \sqrt{1+z}\right)$$

**Involving  $\cos^{-1}$** **Involving  $\sin^{-1}(z)$** Involving  $\sin^{-1}(z)$  and  $\cos^{-1}(z)$ 

01.12.27.0009.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \cos^{-1}(z)$$

Involving  $\sin^{-1}(z)$  and  $\cos^{-1}(-z)$ 

01.12.27.0335.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + \cos^{-1}(-z)$$

Involving  $\sin^{-1}(z)$  and  $\cos^{-1}(1 - 2z^2)$ 

01.12.27.0012.01

$$\sin^{-1}(z) = \frac{1}{2} \cos^{-1}(1 - 2z^2) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0336.01

$$\sin^{-1}(z) = -\frac{1}{2} \cos^{-1}(1 - 2z^2) /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0013.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{2z} \cos^{-1}(1 - 2z^2)$$

Involving  $\sin^{-1}(z)$  and  $\cos^{-1}(2z^2 - 1)$ 

01.12.27.0337.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \frac{1}{2} \cos^{-1}(2z^2 - 1) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0338.01

$$\sin^{-1}(z) = \frac{1}{2} \cos^{-1}(2z^2 - 1) - \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0339.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{2z} (\pi - \cos^{-1}(2z^2 - 1))$$

Involving  $\sin^{-1}(z)$  and  $\cos^{-1}\left(\sqrt{\frac{1+z}{2}}\right)$



01.12.27.0340.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2 \cos^{-1}\left(\sqrt{\frac{z+1}{2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\cos^{-1}\left(\sqrt{\frac{1-z}{2}}\right)$ 

01.12.27.0341.01

$$\sin^{-1}(z) = 2 \cos^{-1}\left(\sqrt{\frac{1-z}{2}}\right) - \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\cos^{-1}\left(\sqrt{z^2}\right)$ 

01.12.27.0342.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \cos^{-1}\left(\sqrt{z^2}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0343.01

$$\sin^{-1}(z) = \cos^{-1}\left(\sqrt{z^2}\right) - \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0344.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{z} \left( \frac{\pi}{2} - \cos^{-1}\left(\sqrt{z^2}\right) \right)$$

Involving  $\sin^{-1}(z)$  and  $\cos^{-1}\left(\sqrt{1-z^2}\right)$ 

01.12.27.0010.01

$$\sin^{-1}(z) = \cos^{-1}\left(\sqrt{1-z^2}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0345.01

$$\sin^{-1}(z) = -\cos^{-1}\left(\sqrt{1-z^2}\right) /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0011.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{z} \cos^{-1}\left(\sqrt{1-z^2}\right)$$

Involving  $\sin^{-1}(z)$  and  $\cos^{-1}\left(2z\sqrt{1-z^2}\right)$ 

01.12.27.0014.01

$$\sin^{-1}(z) = \frac{\pi}{4} - \frac{1}{2} \cos^{-1}\left(2z\sqrt{1-z^2}\right) /; \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4}$$

01.12.27.0346.01

$$\sin^{-1}(z) = \frac{\pi}{4} \left( \frac{\sqrt{z^2}}{z} - \sqrt{\frac{1}{z}} \sqrt{z} \sqrt{\frac{1}{\sqrt{2}z+1}} \sqrt{\sqrt{2}z+1} + \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{-\frac{1}{\sqrt{2}z-1}} \sqrt{1-\sqrt{2}z} + \frac{\sqrt{z^4-z^2}}{z\sqrt{z^2-1}} - \frac{\sqrt{-z^2}\sqrt{z^2-1}\sqrt{2z^2-1}}{\sqrt{1-2z^2}\sqrt{z^4-z^2}} \right) + \frac{\sqrt{-z^2}\sqrt{z^2-1}\sqrt{2z^2-1}}{2\sqrt{1-2z^2}\sqrt{z^4-z^2}} \cos^{-1}\left(2z\sqrt{1-z^2}\right)$$

### Involving $\sin^{-1}(\sqrt{z})$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$  and  $\cos^{-1}(\sqrt{z})$

01.12.27.0347.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} - \cos^{-1}(\sqrt{z})$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$  and  $\cos^{-1}\left(1/\sqrt{\frac{1}{z}}\right)$

01.12.27.0348.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} - \cos^{-1}\left(1/\sqrt{\frac{1}{z}}\right); z \notin (-\infty, 0)$$

01.12.27.0349.01

$$\sin^{-1}(\sqrt{z}) = \cos^{-1}\left(1/\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0350.01

$$\sin^{-1}(\sqrt{z}) = \sqrt{z} \sqrt{\frac{1}{z}} \left( \frac{\pi}{2} - \cos^{-1}\left(1/\sqrt{\frac{1}{z}}\right) \right)$$

### Involving $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$  and  $\cos^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0351.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi}{2} - \cos^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$  and  $\cos^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0352.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi}{2} - \cos^{-1}\left(\sqrt{\frac{1}{z}}\right); z \notin (-\infty, 0)$$

01.12.27.0353.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \cos^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0354.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sqrt{z} \sqrt{\frac{1}{z}} \left(\frac{\pi}{2} - \cos^{-1}\left(\sqrt{\frac{1}{z}}\right)\right)$$

## Involving $\sin^{-1}(\sqrt{z^2})$

Involving  $\sin^{-1}(\sqrt{z^2})$  and  $\cos^{-1}(z)$

01.12.27.0030.01

$$\sin^{-1}(\sqrt{z^2}) = \frac{\pi}{2} - \cos^{-1}(z); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0355.01

$$\sin^{-1}(\sqrt{z^2}) = \cos^{-1}(z) - \frac{\pi}{2}; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0031.01

$$\sin^{-1}(\sqrt{z^2}) = \frac{\sqrt{z^2}}{z} \left(\frac{\pi}{2} - \cos^{-1}(z)\right)$$

## Involving $\sin^{-1}(a(bz^c)^m)$

Involving  $\sin^{-1}(a(bz^c)^m)$  and  $\cos^{-1}(ab^m z^{mc})$

01.12.27.0029.01

$$\sin^{-1}(a(bz^c)^m) = \frac{(bz^c)^m}{b^m z^{mc}} \left(\frac{\pi}{2} - \cos^{-1}(ab^m z^{mc})\right); 2m \in \mathbb{Z}$$

## Involving $\sin^{-1}(1 - 2z^2)$

Involving  $\sin^{-1}(1 - 2z^2)$  and  $\cos^{-1}(z)$

01.12.27.0015.01

$$\sin^{-1}(1 - 2z^2) = 2 \cos^{-1}(z) - \frac{\pi}{2}; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0356.01

$$\sin^{-1}(1 - 2z^2) = \frac{3\pi}{2} - 2\cos^{-1}(z) \quad ; \quad \frac{\pi}{2} < \arg(z) \leq \pi \quad \vee \quad -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0016.01

$$\sin^{-1}(1 - 2z^2) = \pi \left( \frac{1}{2} - \frac{\sqrt{z^2}}{z} \right) + \frac{2\sqrt{z^2}}{z} \cos^{-1}(z)$$

### Involving $\sin^{-1}(2z^2 - 1)$

#### Involving $\sin^{-1}(2z^2 - 1)$ and $\cos^{-1}(z)$

01.12.27.0357.01

$$\sin^{-1}(2z^2 - 1) = -2\cos^{-1}(z) + \frac{\pi}{2} \quad ; \quad -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0358.01

$$\sin^{-1}(2z^2 - 1) = -\frac{3\pi}{2} + 2\cos^{-1}(z) \quad ; \quad \frac{\pi}{2} < \arg(z) \leq \pi \quad \vee \quad -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0359.01

$$\sin^{-1}(2z^2 - 1) = -\pi \left( \frac{1}{2} - \frac{\sqrt{z^2}}{z} \right) - \frac{2\sqrt{z^2}}{z} \cos^{-1}(z)$$

### Involving $\sin^{-1}\left(\frac{z^2-2}{z^2}\right)$

#### Involving $\sin^{-1}\left(\frac{z^2-2}{z^2}\right)$ and $\cos^{-1}\left(\frac{1}{z}\right)$

01.12.27.0360.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = -\frac{\pi}{2} + 2\cos^{-1}\left(\frac{1}{z}\right) \quad ; \quad -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0361.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = \frac{3\pi}{2} - 2\cos^{-1}\left(\frac{1}{z}\right) \quad ; \quad \frac{\pi}{2} \leq \arg(z) \leq \pi \quad \vee \quad -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0362.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = \frac{\pi}{2} \left( 1 - 2z \sqrt{\frac{1}{z^2}} \right) + 2z \sqrt{\frac{1}{z^2}} \cos^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(\frac{2-z^2}{z^2}\right)$

#### Involving $\sin^{-1}\left(\frac{2-z^2}{z^2}\right)$ and $\cos^{-1}\left(\frac{1}{z}\right)$

01.12.27.0363.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = \frac{\pi}{2} - 2 \cos^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0364.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -\frac{3\pi}{2} + 2 \cos^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0365.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -\frac{\pi}{2} \left(1 - 2z \sqrt{\frac{1}{z^2}}\right) - 2z \sqrt{\frac{1}{z^2}} \cos^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}(\sqrt{1-z})$

Involving  $\sin^{-1}(\sqrt{1-z})$  and  $\cos^{-1}(\sqrt{z})$

01.12.27.0017.01

$$\sin^{-1}(\sqrt{1-z}) = \cos^{-1}(\sqrt{z})$$

### Involving $\sin^{-1}\left(\sqrt{\frac{1+cz}{2}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1+z}{2}}\right)$  and  $\cos^{-1}(z)$

01.12.27.0018.01

$$\sin^{-1}\left(\sqrt{\frac{1+z}{2}}\right) = \frac{\pi - \cos^{-1}(z)}{2}$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right)$  and  $\cos^{-1}(z)$

01.12.27.0019.01

$$\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right) = \frac{1}{2} \cos^{-1}(z)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$  and  $\cos^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0022.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \cos^{-1}\left(\frac{1}{\sqrt{z}}\right); |\arg(z)| < \pi$$

01.12.27.0366.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \pi - \cos^{-1}\left(\frac{1}{\sqrt{z}}\right); (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0023.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\pi}{2} \left(1 - \sqrt{\frac{1}{z}} \sqrt{z}\right) + \sqrt{\frac{1}{z}} \sqrt{z} \cos^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$  and  $\cos^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0367.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \cos^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$  and  $\cos^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0368.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \cos^{-1}\left(\frac{1}{\sqrt{z}}\right); z \notin (-\infty, 1)$$

01.12.27.0369.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -\cos^{-1}\left(\frac{1}{\sqrt{z}}\right); (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0370.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \pi - \cos^{-1}\left(\frac{1}{\sqrt{z}}\right); (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0371.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \sqrt{z-1} \sqrt{\frac{1}{z-1}} \cos^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{1}{2} \left(\sqrt{z} \sqrt{\frac{1}{z}} - 1\right) \pi$$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$  and  $\cos^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0372.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \cos^{-1}\left(\sqrt{\frac{1}{z}}\right); z \notin (0, 1)$$

01.12.27.0373.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -\cos^{-1}\left(\sqrt{\frac{1}{z}}\right); (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0374.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} \cos^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

**Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$**

**Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$  and  $\cos^{-1}\left(\frac{1}{\sqrt{z}}\right)$**

01.12.27.0020.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \cos^{-1}\left(\frac{1}{\sqrt{z}}\right); |\arg(z)| < \pi$$

01.12.27.0375.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \pi - \cos^{-1}\left(\frac{1}{\sqrt{z}}\right); (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0021.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{1}{2} \left( 2\sqrt{\frac{1}{z}} \sqrt{z} \cos^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi \sqrt{\frac{1}{z}} \sqrt{z} + \pi \right)$$

**Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$  and  $\cos^{-1}\left(\sqrt{\frac{1}{z}}\right)$**

01.12.27.0376.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \cos^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

**Involving  $\sin^{-1}\left(\frac{\sqrt{z+a}}{\sqrt{2z}}\right)$**

**Involving  $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right)$  and  $\cos^{-1}\left(\frac{1}{z}\right)$**

01.12.27.0028.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right) = \frac{1}{2} \cos^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right)$  and  $\cos^{-1}\left(\frac{1}{z}\right)$

01.12.27.0025.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} \left( \pi - \cos^{-1}\left(\frac{1}{z}\right) \right); z \notin (-1, 0)$$

01.12.27.0377.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} \cos^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0026.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} \sqrt{1 + \frac{1}{z}} \sqrt{\frac{z}{z+1}} \left( \pi - \cos^{-1}\left(\frac{1}{z}\right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{a-z}}{\sqrt{-2z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right)$  and  $\cos^{-1}\left(\frac{1}{z}\right)$

01.12.27.0378.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = \frac{1}{2} \cos^{-1}\left(\frac{1}{z}\right); z \notin (0, 1)$$

01.12.27.0379.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = -\frac{1}{2} \cos^{-1}\left(\frac{1}{z}\right); (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0380.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = \frac{1}{2} \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} \cos^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-2z}}\right)$  and  $\cos^{-1}\left(\frac{1}{z}\right)$

01.12.27.0381.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-2z}}\right) = \frac{1}{2} \left( \pi - \cos^{-1}\left(\frac{1}{z}\right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+a}{2z}}\right)$



Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right)$  and  $\cos^{-1}\left(\frac{1}{z}\right)$

01.12.27.0027.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right) = \frac{1}{2} \cos^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right)$  and  $\cos^{-1}\left(\frac{1}{z}\right)$

01.12.27.0024.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right) = \frac{1}{2} \left( \pi - \cos^{-1}\left(\frac{1}{z}\right) \right)$$

**Involving  $\sin^{-1}\left(\sqrt{1-z^2}\right)$**

Involving  $\sin^{-1}\left(\sqrt{1-z^2}\right)$  and  $\cos^{-1}(z)$

01.12.27.0032.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \cos^{-1}(z) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0382.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \pi - \cos^{-1}(z) /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0033.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \frac{\sqrt{z^2}}{z} \cos^{-1}(z) + \frac{\pi}{2} \left( 1 - \frac{\sqrt{z^2}}{z} \right)$$

**Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$**

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$  and  $\cos^{-1}\left(\frac{1}{z}\right)$

01.12.27.0383.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \cos^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) > 0$$

01.12.27.0384.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \cos^{-1}\left(\frac{1}{z}\right) - \pi /; \operatorname{Re}(z) < 0$$

01.12.27.0385.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \pi - \cos^{-1}\left(\frac{1}{z}\right) /; (i z \in \mathbb{R} \wedge i z < 0)$$

01.12.27.0386.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -\cos^{-1}\left(\frac{1}{z}\right) /; (i z \in \mathbb{R} \wedge i z > 0)$$

01.12.27.0035.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi}{2} \left(\frac{\sqrt{z^2}}{z} - 1\right) + \cos^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) \neq 0$$

01.12.27.0036.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\sqrt{z^2}}{2z} \left(2\sqrt{\frac{1}{z^2}} \cos^{-1}\left(\frac{1}{z}\right)z - \pi\sqrt{\frac{1}{z^2}}z + \pi\right)$$

**Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$**

**Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$  and  $\cos^{-1}\left(\frac{1}{z}\right)$**

01.12.27.0387.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \cos^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0388.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \pi - \cos^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0389.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi}{2} \left(1 - \sqrt{\frac{1}{z^2}}z\right) + z\sqrt{\frac{1}{z^2}} \cos^{-1}\left(\frac{1}{z}\right)$$

**Involving  $\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$**

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$  and  $\cos^{-1}\left(\frac{1}{z}\right)$

01.12.27.0390.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \cos^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} \leq \arg(z) < 0 \vee 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0391.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \pi - \cos^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} \leq \arg(z) < \pi \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0392.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -\cos^{-1}\left(\frac{1}{z}\right); (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0393.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \cos^{-1}\left(\frac{1}{z}\right) - \pi; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0394.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \sqrt{1 - \frac{1}{z^2}} \sqrt{\frac{z^2}{z^2 - 1}} \left( \frac{1}{2} \pi \left( 1 - \sqrt{\frac{1}{z^2}} z \right) + z \sqrt{\frac{1}{z^2}} \cos^{-1}\left(\frac{1}{z}\right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$  and  $\cos^{-1}\left(\frac{1}{z}\right)$

01.12.27.0395.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \cos^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0396.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \pi - \cos^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0397.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi}{2} \left(1 - \sqrt{\frac{1}{z^2}} z\right) + z \sqrt{\frac{1}{z^2}} \cos^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(2z\sqrt{1-z^2}\right)$

#### Involving $\sin^{-1}\left(2z\sqrt{1-z^2}\right)$ and $\cos^{-1}(z)$

01.12.27.0034.01

$$\sin^{-1}\left(2z\sqrt{1-z^2}\right) = \pi - 2\cos^{-1}(z) \quad ; \quad \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4}$$

01.12.27.0398.01

$$\begin{aligned} \sin^{-1}\left(2z\sqrt{1-z^2}\right) &= \frac{\pi\sqrt{1-2z^2}\sqrt{z^4-z^2}}{2\sqrt{-z^2}\sqrt{z^2-1}\sqrt{2z^2-1}} \\ &\quad \left( \frac{\sqrt{z^2}}{z} - \sqrt{\frac{1}{z}} \sqrt{z} \sqrt{\frac{1}{\sqrt{2}z+1}} \sqrt{\sqrt{2}z+1} + \sqrt{\frac{1}{z}} \sqrt{-z} \sqrt{\frac{1}{1-\sqrt{2}z}} \sqrt{1-\sqrt{2}z} + \frac{\sqrt{z^4-z^2}}{z\sqrt{z^2-1}} - 2 \right) + \\ &\quad \frac{2\sqrt{1-2z^2}\sqrt{z^4-z^2}}{\sqrt{-z^2}\sqrt{z^2-1}\sqrt{2z^2-1}} \cos^{-1}(z) \end{aligned}$$

### Involving $\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right)$

#### Involving $\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right)$ and $\cos^{-1}\left(\frac{1}{z}\right)$

01.12.27.0399.01

$$\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = \pi - 2\cos^{-1}\left(\frac{1}{z}\right) \quad ; \quad \frac{\pi}{4} \leq |\arg(z)| < \frac{\pi}{2} \vee |z| \geq \sqrt{2} \wedge |\arg(z)| < \frac{\pi}{4}$$

01.12.27.0400.01

$$\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = \frac{2\sqrt{z^2}}{z} \left(\frac{\pi}{2} - \cos^{-1}\left(\frac{1}{z}\right)\right) \quad ; \quad \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4} \vee |z| \geq \sqrt{2}$$

01.12.27.0401.01

$$\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) =$$

$$-\frac{z^3\sqrt{z^2-2}\sqrt{z^2-1}}{2\sqrt{1-z}(z+1)\sqrt{-z^4+3z^2-2}}\sqrt{\frac{1-z^2}{z^4}}\sqrt{\frac{1}{z}}\sqrt{-\frac{z+1}{z}}\left(\pi\left(\frac{z^3}{1-z^2}\sqrt{\frac{1-z^2}{z^2}}\sqrt{\frac{1-z^2}{z^4}}+\sqrt{\frac{1}{z^2}}z-\right.\right.$$

$$\left.\left.\sqrt{\frac{1}{z}}\sqrt{\frac{z}{z+\sqrt{2}}}\sqrt{\frac{z+\sqrt{2}}{z}}\sqrt{z}+\sqrt{1-\frac{\sqrt{2}}{z}}\sqrt{-\frac{1}{z}}\sqrt{-z}\sqrt{\frac{z}{z-\sqrt{2}}}-2\right)+4\cos^{-1}\left(\frac{1}{z}\right)\right)$$

Involving  $\sin^{-1}\left(\sqrt{\left(1-\sqrt{1+cz^2}\right)/2}\right)$

Involving  $\sin^{-1}\left(\sqrt{\left(1-\sqrt{1+z^2}\right)/2}\right)$  and  $\cos^{-1}(iz)$

01.12.27.0037.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+z^2}}{2}}\right) = \frac{\pi}{4} - \frac{1}{2}\cos^{-1}(iz) ; -\pi < \arg(z) \leq 0$$

01.12.27.0402.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{z^2+1}\right)}\right) = \frac{1}{2}\cos^{-1}(iz) - \frac{\pi}{4} ; 0 < \arg(z) \leq \pi$$

Involving  $\sin^{-1}\left(\sqrt{\left(1-\sqrt{1-z^2}\right)/2}\right)$  and  $\cos^{-1}(z)$

01.12.27.0038.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2}}\right) = \frac{1}{2}\left(\frac{\pi}{2}-\cos^{-1}(z)\right) ; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0403.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{1-z^2}\right)}\right) = \frac{1}{2}\left(\cos^{-1}(z)-\frac{\pi}{2}\right) ; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0039.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2}}\right) = \frac{\sqrt{z^2}}{2z}\left(\frac{\pi}{2}-\cos^{-1}(z)\right)$$

**Involving  $\sin^{-1}\left(z\sqrt{1-\sqrt{1-z^2}}/\sqrt{2z^2}\right)$**

Involving  $\sin^{-1}\left(z\sqrt{1-\sqrt{1-z^2}}/\sqrt{2z^2}\right)$  and  $\cos^{-1}(z)$

01.12.27.0040.01

$$\sin^{-1}\left(\frac{z\sqrt{1-\sqrt{1-z^2}}}{\sqrt{2}\sqrt{z^2}}\right) = \frac{1}{2}\left(\frac{\pi}{2}-\cos^{-1}(z)\right)$$

**Involving  $\sin^{-1}\left(z\sqrt{(1-\sqrt{1-z^2})/(2z^2)}\right)$**

Involving  $\sin^{-1}\left(z\sqrt{(1-\sqrt{1-z^2})/(2z^2)}\right)$  and  $\cos^{-1}(z)$

01.12.27.0404.01

$$\sin^{-1}\left(z\sqrt{\frac{1-\sqrt{1-z^2}}{2z^2}}\right) = \frac{1}{2}\left(\frac{\pi}{2}-\cos^{-1}(z)\right)$$

**Involving  $\sin^{-1}\left(\sqrt{z-\sqrt{z^2-1}}/\sqrt{2z}\right)$**

Involving  $\sin^{-1}\left(\sqrt{z-\sqrt{z^2-1}}/\sqrt{2z}\right)$  and  $\cos^{-1}\left(\frac{1}{z}\right)$

01.12.27.0405.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = \frac{1}{2} \left( \frac{\pi}{2} - \cos^{-1} \left( \frac{1}{z} \right) \right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0406.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = \frac{3\pi}{4} - \frac{1}{2} \cos^{-1} \left( \frac{1}{z} \right) /; \frac{\pi}{2} < \arg(z) < \pi \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0407.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = \frac{1}{2} \cos^{-1} \left( \frac{1}{z} \right) - \frac{3\pi}{4} /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0408.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = \frac{1}{2} \cos^{-1} \left( \frac{1}{z} \right) + \frac{\pi}{4} /; (iz \in \mathbb{R} \wedge iz > 0)$$

01.12.27.0409.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = \sqrt{z} \sqrt{\frac{1}{z}} \sqrt{z+1} \sqrt{\frac{1}{z+1}} \left( \frac{1}{2} \sqrt{-iz} \sqrt{-\frac{1}{iz}} \left( \frac{\pi}{2} - \cos^{-1} \left( \frac{1}{z} \right) \right) - \frac{1}{4} \pi \left( \frac{\sqrt{z^2}}{z} - 1 \right) \right)$$

Involving  $\sin^{-1} \left( \sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}} \right)$

Involving  $\sin^{-1} \left( \sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}} \right)$  and  $\cos^{-1} \left( \frac{1}{z} \right)$

01.12.27.0410.01

$$\sin^{-1} \left( \sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}} \right) = \frac{1}{2} \left( \frac{\pi}{2} - \cos^{-1} \left( \frac{1}{z} \right) \right) /; \operatorname{Re}(z) > 0$$

01.12.27.0411.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{3\pi}{4} - \frac{1}{2} \cos^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) < 0$$

01.12.27.0412.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2} \cos^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{4}; (iz \in \mathbb{R} \wedge iz < 0)$$

01.12.27.0413.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2} \cos^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{4}; (iz \in \mathbb{R} \wedge iz > 0)$$

01.12.27.0414.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2} \pi \left(1 - \frac{\sqrt{z^2}}{2z}\right) - \frac{1}{2} \cos^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) \neq 0$$

01.12.27.0415.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2} \sqrt{z^2} \sqrt{\frac{1}{z^2}} \left(\frac{\pi}{2} - \cos^{-1}\left(\frac{1}{z}\right)\right) - \frac{1}{4} \pi \left(\frac{\sqrt{z^2}}{z} - 1\right)$$

Involving  $\sin^{-1}\left(c z^{-r} \sqrt{-1 + \frac{z^{2r}}{c^2}}\right)$

Involving  $\sin^{-1}\left(c z^{-r} \sqrt{-1 + \frac{z^{2r}}{c^2}}\right)$  and  $\cos^{-1}\left(\frac{c}{z^r}\right)$

01.12.27.0416.01

$$\sin^{-1}\left(c z^{-r} \sqrt{\frac{z^{2r}}{c^2} - 1}\right) = \sqrt{c^2 z^{-2r}} \sqrt{\frac{z^{2r}}{c^2}} \left(\frac{\pi z^r \sqrt{c^2 z^{-2r}}}{2c} + \cos^{-1}\left(\frac{c}{z^r}\right) - \frac{\pi}{2}\right)$$

**Involving  $\tan^{-1}$**

**Involving  $\sin^{-1}(z)$**

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right)$



01.12.27.0417.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \tan^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right); -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0418.01

$$\sin^{-1}(z) = -\tan^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right) - \frac{\pi}{2}; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0419.01

$$\sin^{-1}(z) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2}} - \tan^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right)$

01.12.27.0420.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \tan^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right); \operatorname{Re}(z) > 0$$

01.12.27.0421.01

$$\sin^{-1}(z) = \tan^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right) - \frac{\pi}{2}; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0422.01

$$\sin^{-1}(z) = -\tan^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right) - \frac{\pi}{2}; (i z \in \mathbb{R} \wedge i z < 0)$$

01.12.27.0423.01

$$\sin^{-1}(z) = \tan^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right) + \frac{\pi}{2}; (i z \in \mathbb{R} \wedge i z > 0)$$

01.12.27.0424.01

$$\sin^{-1}(z) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2}} - \frac{\sqrt{z^2}}{z} \tan^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right)$

01.12.27.0425.01

$$\sin^{-1}(z) = \tan^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right) + \frac{\pi}{2}; -\frac{\pi}{2} < \arg(z) < 0 \vee 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0426.01

$$\sin^{-1}(z) = -\tan^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right) - \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) < \pi \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0427.01

$$\sin^{-1}(z) = \tan^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right) - \frac{\pi}{2} /; (i z \in \mathbb{R} \wedge i z < 0) \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0428.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \tan^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right) /; (i z \in \mathbb{R} \wedge i z > 0) \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0429.01

$$\sin^{-1}(z) = \frac{1}{2} \sqrt{\frac{1}{z^2}} (\pi z) - \frac{\sqrt{-z^2} \sqrt{1-z^2}}{z \sqrt{z^2-1}} \tan^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right)$

01.12.27.0430.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \tan^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0431.01

$$\sin^{-1}(z) = \tan^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right) - \frac{\pi}{2} /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0432.01

$$\sin^{-1}(z) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2}} - \frac{z}{\sqrt{1-z^2}} \sqrt{\frac{1-z^2}{z^2}} \tan^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right)$

01.12.27.0041.01

$$\sin^{-1}(z) = \tan^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right) /; z \notin (-\infty, -1) \wedge z \notin (1, \infty)$$

01.12.27.0433.01

$$\sin^{-1}(z) = \tan^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right) + \pi /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0434.01

$$\sin^{-1}(z) = \tan^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0042.01

$$\sin^{-1}(z) = \tan^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right) - \frac{\pi}{2} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right)$

01.12.27.0435.01

$$\sin^{-1}(z) = \tan^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2} \wedge z \notin (1, \infty)$$

01.12.27.0436.01

$$\sin^{-1}(z) = -\tan^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right) /; \frac{\pi}{2} < \arg(z) < \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0437.01

$$\sin^{-1}(z) = -\tan^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0438.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{z} \tan^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right) - \frac{\pi}{2} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right)$

01.12.27.0439.01

$$\sin^{-1}(z) = -\tan^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right) /; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0440.01

$$\sin^{-1}(z) = \tan^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right) /; \frac{\pi}{2} < \arg(z) < \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0441.01

$$\sin^{-1}(z) = \pi - \tan^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0442.01

$$\sin^{-1}(z) = \tan^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0443.01

$$\sin^{-1}(z) = -\frac{\sqrt{-z^2} \sqrt{z^2-1}}{z \sqrt{1-z^2}} \tan^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right) - \frac{\pi}{2} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right)$

01.12.27.0444.01

$$\sin^{-1}(z) = \tan^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2} \wedge z \notin (1, \infty)$$

01.12.27.0445.01

$$\sin^{-1}(z) = -\tan^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right) /; \frac{\pi}{2} < \arg(z) < \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0446.01

$$\sin^{-1}(z) = \tan^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0447.01

$$\sin^{-1}(z) = \frac{\sqrt{1-z^2}}{z} \sqrt{\frac{z^2}{1-z^2}} \tan^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right) - \frac{1}{2} \pi \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\frac{2z\sqrt{1-z^2}}{1-2z^2}\right)$

01.12.27.0043.02

$$\sin^{-1}(z) = \frac{1}{2} \tan^{-1}\left(\frac{2z\sqrt{1-z^2}}{1-2z^2}\right) /; \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4}$$

01.12.27.0448.01

$$\sin^{-1}(z) = \frac{\pi}{4} \left( \frac{\sqrt{z^2-1} z}{\sqrt{z^4-z^2}} + \sqrt{\frac{1}{z}} \sqrt{\frac{1}{\sqrt{2} z-1}} \sqrt{\sqrt{2} z-1} \sqrt{z} - \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{-\sqrt{2} z-1} \sqrt{-\frac{1}{\sqrt{2} z+1}} + \frac{\sqrt{z^2}}{z} \right) + \frac{1}{2} \tan^{-1}\left(\frac{2z\sqrt{1-z^2}}{1-2z^2}\right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\frac{1-2z^2}{2z\sqrt{1-z^2}}\right)$

01.12.27.0449.01

$$\sin^{-1}(z) = \frac{\pi}{4} - \frac{1}{2} \tan^{-1}\left(\frac{1-2z^2}{2z\sqrt{1-z^2}}\right) /; -\frac{\pi}{2} \leq \arg(z) < 0 \vee 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0450.01

$$\sin^{-1}(z) = -\frac{\pi}{4} - \frac{1}{2} \tan^{-1}\left(\frac{1-2z^2}{2z\sqrt{1-z^2}}\right) /; \frac{\pi}{2} \leq \arg(z) < \pi \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0451.01

$$\sin^{-1}(z) = -\frac{1}{2} \tan^{-1}\left(\frac{1-2z^2}{2z\sqrt{1-z^2}}\right) - \frac{3\pi}{4} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0452.01

$$\sin^{-1}(z) = -\frac{1}{2} \tan^{-1}\left(\frac{1-2z^2}{2z\sqrt{1-z^2}}\right) + \frac{3\pi}{4} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0453.01

$$\sin^{-1}(z) = \frac{\pi}{4} \left( -\sqrt{\frac{1}{1-z}} \sqrt{1-z} + \sqrt{\frac{1}{z+1}} \sqrt{z+1} - \sqrt{-iz} \sqrt{\frac{i}{z}} + \sqrt{-\frac{i}{z}} \sqrt{iz} + \frac{\sqrt{z^2}}{z} \right) - \frac{1}{2} \tan^{-1}\left(\frac{1-2z^2}{2z\sqrt{1-z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{1+z}}\right)$

01.12.27.0454.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2 \tan^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{1+z}}\right) /; z \notin (-\infty, -1)$$

01.12.27.0455.01

$$\sin^{-1}(z) = -\frac{3\pi}{2} - 2 \tan^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{1+z}}\right) /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0456.01

$$\sin^{-1}(z) = -\pi \left( \frac{1}{2} - \sqrt{z+1} \sqrt{\frac{1}{z+1}} \right) - 2 \tan^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{z+1}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{-z-1}}\right)$

01.12.27.0457.01

$$\sin^{-1}(z) = \frac{\pi}{2} + 2 \tan^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{-z-1}}\right) /; z \notin (-\infty, 1)$$

01.12.27.0458.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2 \tan^{-1} \left( \frac{\sqrt{z-1}}{\sqrt{-z-1}} \right); (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.0459.01

$$\sin^{-1}(z) = -\frac{3\pi}{2} + 2 \tan^{-1} \left( \frac{\sqrt{z-1}}{\sqrt{-z-1}} \right); (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0460.01

$$\sin^{-1}(z) = \pi \left( -\frac{1}{2} + \sqrt{z+1} \sqrt{\frac{1}{z+1}} \right) - \frac{2\sqrt{z-1}\sqrt{z+1}}{\sqrt{-z-1}\sqrt{1-z}} \tan^{-1} \left( \frac{\sqrt{z-1}}{\sqrt{-z-1}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1} \left( \sqrt{\frac{1-z}{1+z}} \right)$

01.12.27.0461.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2 \tan^{-1} \left( \sqrt{\frac{1-z}{1+z}} \right); z \notin (-\infty, -1)$$

01.12.27.0462.01

$$\sin^{-1}(z) = 2 \tan^{-1} \left( \sqrt{\frac{1-z}{z+1}} \right) - \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0463.01

$$\sin^{-1}(z) = -\pi \left( \frac{1}{2} - \sqrt{z+1} \sqrt{\frac{1}{z+1}} \right) - 2\sqrt{z+1} \sqrt{\frac{1}{z+1}} \tan^{-1} \left( \sqrt{\frac{1-z}{z+1}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1} \left( \frac{\sqrt{1+z}}{\sqrt{1-z}} \right)$

01.12.27.0464.01

$$\sin^{-1}(z) = 2 \tan^{-1} \left( \frac{\sqrt{z+1}}{\sqrt{1-z}} \right) - \frac{\pi}{2}; z \notin (1, \infty)$$

01.12.27.0465.01

$$\sin^{-1}(z) = \frac{3\pi}{2} + 2 \tan^{-1} \left( \frac{\sqrt{1+z}}{\sqrt{1-z}} \right); (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0466.01

$$\sin^{-1}(z) = 2 \tan^{-1} \left( \frac{\sqrt{z+1}}{\sqrt{1-z}} \right) + \left( \frac{1}{2} - \sqrt{1-z} \sqrt{\frac{1}{1-z}} \right) \pi$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1} \left( \frac{\sqrt{-z-1}}{\sqrt{z-1}} \right)$

01.12.27.0467.01

$$\sin^{-1}(z) = -2 \tan^{-1} \left( \frac{\sqrt{-z-1}}{\sqrt{z-1}} \right) - \frac{\pi}{2}; z \notin (-1, \infty)$$

01.12.27.0468.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + 2 \tan^{-1} \left( \frac{\sqrt{-z-1}}{\sqrt{z-1}} \right); (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.0469.01

$$\sin^{-1}(z) = \frac{3\pi}{2} - 2 \tan^{-1} \left( \frac{\sqrt{-z-1}}{\sqrt{z-1}} \right); (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0470.01

$$\sin^{-1}(z) = \pi \left( \frac{1}{2} - \sqrt{1-z} \sqrt{\frac{1}{1-z}} \right) + \frac{2\sqrt{z-1}\sqrt{z+1}}{\sqrt{-z-1}\sqrt{1-z}} \tan^{-1} \left( \frac{\sqrt{-z-1}}{\sqrt{z-1}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1} \left( \sqrt{\frac{1+z}{1-z}} \right)$

01.12.27.0471.01

$$\sin^{-1}(z) = 2 \tan^{-1} \left( \sqrt{\frac{1+z}{1-z}} \right) - \frac{\pi}{2}; z \notin (1, \infty)$$

01.12.27.0472.01

$$\sin^{-1}(z) = \frac{3\pi}{2} - 2 \tan^{-1} \left( \sqrt{\frac{z+1}{1-z}} \right); (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0473.01

$$\sin^{-1}(z) = \pi \left( \frac{1}{2} - \sqrt{1-z} \sqrt{\frac{1}{1-z}} \right) + 2 \sqrt{\frac{1}{1-z}} \sqrt{1-z} \tan^{-1} \left( \sqrt{\frac{z+1}{1-z}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1} \left( \frac{\sqrt{1-z^2} + 1}{z} \right)$

01.12.27.0474.01

$$\sin^{-1}(z) = \pi - 2 \tan^{-1} \left( \frac{\sqrt{1-z^2} + 1}{z} \right); -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0475.01

$$\sin^{-1}(z) = -2 \tan^{-1} \left( \frac{\sqrt{1-z^2} + 1}{z} \right) - \pi; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0476.01

$$\sin^{-1}(z) = \pi \sqrt{\frac{1}{z^2}} z - 2 \tan^{-1} \left( \frac{\sqrt{1-z^2} + 1}{z} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\frac{1-\sqrt{1-z^2}}{z}\right)$

01.12.27.0477.01

$$\sin^{-1}(z) = 2 \tan^{-1}\left(\frac{1-\sqrt{1-z^2}}{z}\right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right)$

01.12.27.0478.01

$$\sin^{-1}(z) = 2 \tan^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right)$$

Involving  $\sin^{-1}(z)$  and  $\tan^{-1}\left(\frac{z}{1-\sqrt{1-z^2}}\right)$

01.12.27.0479.01

$$\sin^{-1}(z) = \pi - 2 \tan^{-1}\left(\frac{z}{1-\sqrt{1-z^2}}\right) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0480.01

$$\sin^{-1}(z) = -2 \tan^{-1}\left(\frac{z}{1-\sqrt{1-z^2}}\right) - \pi /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0481.01

$$\sin^{-1}(z) = \pi \sqrt{\frac{1}{z^2}} z - 2 \tan^{-1}\left(\frac{z}{1-\sqrt{1-z^2}}\right)$$

**Involving  $\sin^{-1}\left(\frac{2z}{z^2+1}\right)$**

Involving  $\sin^{-1}\left(\frac{2z}{z^2+1}\right)$  and  $\tan^{-1}(z)$

01.12.27.0044.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = 2 \tan^{-1}(z) /; |z| < 1$$

01.12.27.0482.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \pi - 2 \tan^{-1}(z) /; |z| > 1 \wedge -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$



01.12.27.0483.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = -2 \tan^{-1}(z) - \pi ; |z| > 1 \wedge \left(\frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}\right)$$

01.12.27.0484.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \frac{\pi \sqrt{z^2}}{z} - 2 \tan^{-1}(z) ; |z| > 1$$

01.12.27.0485.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \frac{\pi \sqrt{z^2}}{2z} \left(1 - \frac{1-z}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2}\right) + \frac{2(1-z)}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2} \tan^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{2z}{z^2+1}\right)$  and  $\tan^{-1}\left(\frac{1}{z}\right)$

01.12.27.0486.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \pi - 2 \tan^{-1}\left(\frac{1}{z}\right) ; |z| < 1 \wedge -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0487.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = -2 \tan^{-1}\left(\frac{1}{z}\right) - \pi ; |z| < 1 \wedge \left(\frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}\right)$$

01.12.27.0488.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \pi z \sqrt{\frac{1}{z^2}} - 2 \tan^{-1}\left(\frac{1}{z}\right) ; |z| < 1$$

01.12.27.0045.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = 2 \tan^{-1}\left(\frac{1}{z}\right) ; |z| > 1$$

01.12.27.0489.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2} \left(\frac{1-z}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2} + 1\right)} - \frac{2(1-z)}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2} \tan^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{2z}{z^2+1}\right)$  and  $\tan^{-1}(z')$

01.12.27.0490.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = 2 \tan^{-1}\left(\frac{z \sqrt{\left(\frac{z+1}{z-1}\right)^2}}{z+1}\right)$$

Involving  $\sin^{-1}\left(\frac{1-z}{1+z}\right)$

Involving  $\sin^{-1}\left(\frac{1-z}{1+z}\right)$  and  $\tan^{-1}(\sqrt{z})$

01.12.27.0491.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{\pi}{2} - 2 \tan^{-1}(\sqrt{z}) /; z \notin (-\infty, -1)$$

01.12.27.0492.01

$$\sin^{-1}\left(\frac{1-z}{z+1}\right) = 2 \tan^{-1}(\sqrt{z}) - \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0493.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \left(\sqrt{z+1} \sqrt{\frac{1}{z+1}} - \frac{1}{2}\right) \pi - 2 \sqrt{z+1} \sqrt{\frac{1}{z+1}} \tan^{-1}(\sqrt{z})$$

Involving  $\sin^{-1}\left(\frac{1-z}{1+z}\right)$  and  $\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0494.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = 2 \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2} /; |\arg(z)| < \pi$$

01.12.27.0495.01

$$\sin^{-1}\left(\frac{1-z}{z+1}\right) = -2 \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0496.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{\pi}{2} \left(-2 \sqrt{\frac{1}{z}} \sqrt{z} + 2 \sqrt{\frac{1}{z+1}} \sqrt{z+1} - 1\right) + 2 \sqrt{\frac{1}{z+1}} \sqrt{z+1} \tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1-z}{1+z}\right)$  and  $\tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0497.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = 2 \tan^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2} /; z \notin (-1, 0)$$

01.12.27.0498.01

$$\sin^{-1}\left(\frac{1-z}{z+1}\right) = \frac{3\pi}{2} - 2 \tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0499.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{\pi}{2} \left(-2 \sqrt{\frac{1}{z}} \sqrt{z} + 2 \sqrt{\frac{1}{z+1}} \sqrt{z+1} - 1\right) + 2 \sqrt{\frac{z}{z+1}} \sqrt{\frac{z+1}{z}} \tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{z-1}{z+1}\right)$

Involving  $\sin^{-1}\left(\frac{z-1}{z+1}\right)$  and  $\tan^{-1}(\sqrt{z})$

01.12.27.0500.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\frac{\pi}{2} + 2 \tan^{-1}(\sqrt{z}) /; z \notin (-\infty, -1)$$

01.12.27.0501.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -2 \tan^{-1}(\sqrt{z}) + \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0502.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\left(\sqrt{z+1} \sqrt{\frac{1}{z+1}} - \frac{1}{2}\right)\pi + 2\sqrt{z+1} \sqrt{\frac{1}{z+1}} \tan^{-1}(\sqrt{z})$$

Involving  $\sin^{-1}\left(\frac{z-1}{z+1}\right)$  and  $\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0503.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -2 \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2} /; |\arg(z)| < \pi$$

01.12.27.0504.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = 2 \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0505.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\frac{\pi}{2} \left(-2\sqrt{\frac{1}{z}} \sqrt{z} + 2\sqrt{\frac{1}{z+1}} \sqrt{z+1} - 1\right) - 2\sqrt{\frac{1}{z+1}} \sqrt{z+1} \tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{z-1}{z+1}\right)$  and  $\tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0506.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -2 \tan^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2} /; z \notin (-1, 0)$$

01.12.27.0507.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\frac{3\pi}{2} + 2 \tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0508.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\frac{\pi}{2} \left(-2\sqrt{\frac{1}{z}} \sqrt{z} + 2\sqrt{\frac{1}{z+1}} \sqrt{z+1} - 1\right) - 2\sqrt{\frac{z}{z+1}} \sqrt{\frac{z+1}{z}} \tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1+z}{1-z}\right)$

Involving  $\sin^{-1}\left(\frac{1+z}{1-z}\right)$  and  $\tan^{-1}(\sqrt{-z})$

01.12.27.0509.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \frac{\pi}{2} - 2 \tan^{-1}(\sqrt{-z}) \quad ; z \notin (1, \infty)$$

01.12.27.0510.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = 2 \tan^{-1}(\sqrt{-z}) - \frac{3\pi}{2} \quad ; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0511.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \left(\sqrt{1-z} \sqrt{\frac{1}{1-z}} - \frac{1}{2}\right) \pi - 2 \sqrt{1-z} \sqrt{\frac{1}{1-z}} \tan^{-1}(\sqrt{-z})$$

Involving  $\sin^{-1}\left(\frac{1+z}{1-z}\right)$  and  $\tan^{-1}\left(\frac{1}{\sqrt{-z}}\right)$

01.12.27.0512.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = 2 \tan^{-1}\left(\frac{1}{\sqrt{-z}}\right) - \frac{\pi}{2} \quad ; z \notin (0, \infty)$$

01.12.27.0513.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = -2 \tan^{-1}\left(\frac{1}{\sqrt{-z}}\right) - \frac{\pi}{2} \quad ; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0514.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \frac{1}{2} \pi \left( 2 \sqrt{\frac{1}{1-z}} \sqrt{1-z} - 2 \sqrt{-\frac{1}{z}} \sqrt{-z} - 1 \right) + 2 \sqrt{\frac{1}{1-z}} \sqrt{1-z} \tan^{-1}\left(\frac{1}{\sqrt{-z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1+z}{1-z}\right)$  and  $\tan^{-1}\left(\sqrt{-\frac{1}{z}}\right)$

01.12.27.0515.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = 2 \tan^{-1}\left(\sqrt{-\frac{1}{z}}\right) - \frac{\pi}{2} \quad ; z \notin (0, 1)$$

01.12.27.0516.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \frac{3\pi}{2} - 2 \tan^{-1}\left(\sqrt{-\frac{1}{z}}\right) \quad ; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0517.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \frac{\pi}{2} \left( -2 \sqrt{-\frac{1}{z}} \sqrt{-z} + 2 \sqrt{\frac{1}{1-z}} \sqrt{1-z} - 1 \right) + 2 \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}} \tan^{-1}\left(\sqrt{-\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{z+1}{z-1}\right)$

Involving  $\sin^{-1}\left(\frac{z+1}{z-1}\right)$  and  $\tan^{-1}(\sqrt{-z})$

01.12.27.0518.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{\pi}{2} + 2 \tan^{-1}(\sqrt{-z}) \ ; \ z \notin (1, \infty)$$

01.12.27.0519.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2 \tan^{-1}(\sqrt{-z}) + \frac{3\pi}{2} \ ; \ (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0520.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\left(\sqrt{1-z} \sqrt{\frac{1}{1-z}} - \frac{1}{2}\right)\pi + 2\sqrt{1-z} \sqrt{\frac{1}{1-z}} \tan^{-1}(\sqrt{-z})$$

Involving  $\sin^{-1}\left(\frac{z+1}{z-1}\right)$  and  $\tan^{-1}\left(\frac{1}{\sqrt{-z}}\right)$

01.12.27.0521.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2 \tan^{-1}\left(\frac{1}{\sqrt{-z}}\right) + \frac{\pi}{2} \ ; \ z \notin (0, \infty)$$

01.12.27.0522.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = 2 \tan^{-1}\left(\frac{1}{\sqrt{-z}}\right) + \frac{\pi}{2} \ ; \ (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0523.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{\pi}{2} \left(-2 \sqrt{-\frac{1}{z}} \sqrt{-z} + 2 \sqrt{\frac{1}{1-z}} \sqrt{1-z} - 1\right) - 2 \sqrt{\frac{1}{1-z}} \sqrt{1-z} \tan^{-1}\left(\frac{1}{\sqrt{-z}}\right)$$

Involving  $\sin^{-1}\left(\frac{z+1}{z-1}\right)$  and  $\tan^{-1}\left(\sqrt{-\frac{1}{z}}\right)$

01.12.27.0524.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2 \tan^{-1}\left(\sqrt{-\frac{1}{z}}\right) + \frac{\pi}{2} \ ; \ z \notin (0, 1)$$

01.12.27.0525.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{3\pi}{2} + 2 \tan^{-1}\left(\sqrt{-\frac{1}{z}}\right) \ ; \ (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0526.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{\pi}{2} \left(-2 \sqrt{-\frac{1}{z}} \sqrt{-z} + 2 \sqrt{\frac{1}{1-z}} \sqrt{1-z} - 1\right) - 2 \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}} \tan^{-1}\left(\sqrt{-\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right)$

Involving  $\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right)$  and  $\tan^{-1}(z)$

01.12.27.0527.01

$$\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right) = \frac{\pi}{2} - 2 \tan^{-1}(z) /; \operatorname{Re}(z) > 0 \vee (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0528.01

$$\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right) = 2 \tan^{-1}(z) + \frac{\pi}{2} /; \operatorname{Re}(z) < 0 \vee (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0529.01

$$\sin^{-1}\left(\frac{1-z^2}{z^2+1}\right) = -2 \tan^{-1}(z) - \frac{3\pi}{2} /; (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0530.01

$$\sin^{-1}\left(\frac{1-z^2}{z^2+1}\right) = 2 \tan^{-1}(z) - \frac{3\pi}{2} /; (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0047.01

$$\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right) = \frac{\pi}{2} - \frac{2\sqrt{z^2}}{z} \tan^{-1}(z) /; iz \notin (-\infty, -1) \wedge iz \notin (1, \infty)$$

01.12.27.0531.01

$$\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right) = \frac{\pi}{2} \left( 2 \sqrt{\frac{1}{iz+1}} \sqrt{iz+1} + 2 \sqrt{\frac{1}{1-iz}} \sqrt{1-iz} - 3 \right) - \frac{2\sqrt{z^2}}{z} \sqrt{\frac{i-z}{i+z}} \sqrt{\frac{i+z}{i-z}} \tan^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right)$  and  $\tan^{-1}\left(\frac{1}{z}\right)$

01.12.27.0532.01

$$\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right) = 2 \tan^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; \operatorname{Re}(z) > 0 \vee (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0533.01

$$\sin^{-1}\left(\frac{1-z^2}{z^2+1}\right) = -2 \tan^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; \operatorname{Re}(z) < 0 \vee (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0534.01

$$\sin^{-1}\left(\frac{1-z^2}{z^2+1}\right) = 2 \tan^{-1}\left(\frac{1}{z}\right) + \frac{3\pi}{2} /; (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0535.01

$$\sin^{-1}\left(\frac{1-z^2}{z^2+1}\right) = \frac{3\pi}{2} - 2 \tan^{-1}\left(\frac{1}{z}\right) /; (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0536.01

$$\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right) = \frac{2\sqrt{z^2}}{z} \sqrt{\frac{i-z}{i+z}} \sqrt{\frac{i+z}{i-z}} \tan^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} \left( 2\sqrt{\frac{-i}{z}} \sqrt{i z} \sqrt{\frac{1}{i z+1}} \sqrt{i z+1} + 2\sqrt{\frac{i}{z}} \sqrt{-i z} \sqrt{\frac{1}{1-i z}} \sqrt{1-i z} - 3 \right)$$

### Involving $\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right)$

#### Involving $\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right)$ and $\tan^{-1}(z)$

01.12.27.0537.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -\frac{\pi}{2} + 2 \tan^{-1}(z) ; \operatorname{Re}(z) > 0 \vee (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.0538.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -2 \tan^{-1}(z) - \frac{\pi}{2} ; \operatorname{Re}(z) < 0 \vee (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.0539.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = 2 \tan^{-1}(z) + \frac{3\pi}{2} ; (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0540.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -2 \tan^{-1}(z) + \frac{3\pi}{2} ; (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.0541.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -\frac{\pi}{2} + \frac{2\sqrt{z^2}}{z} \tan^{-1}(z) ; i z \notin (-\infty, -1) \wedge i z \notin (1, \infty)$$

01.12.27.0542.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -\frac{\pi}{2} \left( 2\sqrt{\frac{1}{i z+1}} \sqrt{i z+1} + 2\sqrt{\frac{1}{1-i z}} \sqrt{1-i z} - 3 \right) + \frac{2\sqrt{z^2}}{z} \sqrt{\frac{i-z}{i+z}} \sqrt{\frac{i+z}{i-z}} \tan^{-1}(z)$$

#### Involving $\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right)$ and $\tan^{-1}\left(\frac{1}{z}\right)$

01.12.27.0543.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -2 \tan^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} ; \operatorname{Re}(z) > 0 \vee (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0544.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = 2 \tan^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} ; \operatorname{Re}(z) < 0 \vee (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.0545.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -2 \tan^{-1}\left(\frac{1}{z}\right) - \frac{3\pi}{2}; (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0546.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -\frac{3\pi}{2} + 2 \tan^{-1}\left(\frac{1}{z}\right); (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0547.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -\frac{2\sqrt{z^2}}{z} \sqrt{\frac{i-z}{i+z}} \sqrt{\frac{i+z}{i-z}} \tan^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} \left( 2 \sqrt{\frac{-i}{z}} \sqrt{iz} \sqrt{\frac{1}{iz+1}} \sqrt{iz+1} + 2 \sqrt{\frac{i}{z}} \sqrt{-iz} \sqrt{\frac{1}{1-iz}} \sqrt{1-iz} - 3 \right)$$

### Involving $\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right)$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right)$ and $\tan^{-1}(\sqrt{z})$

01.12.27.0048.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = \frac{\pi}{2} - \tan^{-1}(\sqrt{z})$$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right)$ and $\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0548.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = \tan^{-1}\left(\frac{1}{\sqrt{z}}\right); z \notin (-1, 0)$$

01.12.27.0549.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) + \pi; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0550.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2} \left( \sqrt{z} \sqrt{\frac{1}{z}} \sqrt{z+1} \sqrt{\frac{1}{z+1}} - 1 \right)$$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right)$ and $\tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0551.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = \tan^{-1}\left(\sqrt{\frac{1}{z}}\right); |\arg(z)| < \pi$$



01.12.27.0552.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = -\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0553.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = -\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) + \pi /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0554.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = \sqrt{z} \sqrt{\frac{1}{z}} \tan^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2} \left( \sqrt{z} \sqrt{\frac{1}{z}} \sqrt{z+1} \sqrt{\frac{1}{z+1}} - 1 \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right)$  and  $\tan^{-1}(\sqrt{z})$

01.12.27.0555.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \frac{\pi}{2} - \tan^{-1}(\sqrt{z}) /; z \notin (-\infty, -1)$$

01.12.27.0556.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \tan^{-1}(\sqrt{z}) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0557.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \sqrt{\frac{1}{z+1}} \sqrt{z+1} \left( \frac{\pi}{2} - \tan^{-1}(\sqrt{z}) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right)$  and  $\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0558.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) /; |\arg(z)| < \pi$$

01.12.27.0559.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) + \pi /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0560.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = -\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0561.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \sqrt{\frac{1}{z+1}} \sqrt{z+1} \left( \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2} \left( \sqrt{z} \sqrt{\frac{1}{z}} \sqrt{z+1} \sqrt{\frac{1}{z+1}} - 1 \right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right)$  and  $\tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0562.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \tan^{-1}\left(\sqrt{\frac{1}{z}}\right); z \notin (-1, 0)$$

01.12.27.0563.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = -\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) + \pi; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0564.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \frac{\pi}{2} \left( 1 - \sqrt{\frac{z}{z+1}} \sqrt{\frac{z+1}{z}} \right) + \sqrt{\frac{z}{z+1}} \sqrt{\frac{z+1}{z}} \tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{a+z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{a+z}}\right)$  and  $\tan^{-1}\left(\sqrt{\frac{z}{a}}\right)$

01.12.27.0565.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \tan^{-1}(\sqrt{z}); z \notin (-\infty, -1)$$

01.12.27.0566.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \pi - \tan^{-1}(\sqrt{z}); (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0053.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \frac{1}{2} \left( \pi - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \left( \pi - 2 \tan^{-1}(\sqrt{z}) \right) \right)$$

01.12.27.0051.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{a+z}}\right) = \frac{1}{2\sqrt{z}} \left( \sqrt{\frac{z}{a+z}} \sqrt{a+z} \right) \left( \pi - \sqrt{\frac{a}{a+z}} \sqrt{\frac{z}{a}} + 1 \left( \pi - 2 \tan^{-1}\left(\sqrt{\frac{z}{a}}\right) \right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right)$  and  $\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0052.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \frac{\pi}{2} - \tan^{-1}\left(\frac{1}{\sqrt{z}}\right); |\arg(z)| < \pi$$

01.12.27.0567.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = -\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0568.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0569.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \frac{\pi}{2} \sqrt{z} \sqrt{\frac{1}{z}} \sqrt{z+1} \sqrt{\frac{1}{z+1}} - \sqrt{z+1} \sqrt{\frac{1}{z+1}} \tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right)$  and  $\tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0570.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \frac{\pi}{2} - \tan^{-1}\left(\sqrt{\frac{1}{z}}\right); z \notin (-1, 0)$$

01.12.27.0571.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \tan^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0572.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \frac{1}{2} \pi \sqrt{z} \sqrt{\frac{1}{z}} \sqrt{z+1} \sqrt{\frac{1}{z+1}} - \sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{z+1}} \tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right)$  and  $\tan^{-1}(\sqrt{z})$

01.12.27.0573.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = \tan^{-1}(\sqrt{z}); |\arg(z)| < \pi$$

01.12.27.0574.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = -\tan^{-1}(\sqrt{z}); (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0575.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = \pi - \tan^{-1}(\sqrt{z}) ; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0576.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right) = \frac{1}{2} \sqrt{1 + \frac{1}{z}} \sqrt{\frac{z}{z+1}} \left( \pi - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \left( \pi - 2 \tan^{-1}(\sqrt{z}) \right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right)$  and  $\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0577.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = \frac{\pi}{2} - \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) ; |\arg(z)| < \pi$$

01.12.27.0578.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right) = \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2} ; (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0579.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right) = \frac{\pi}{2} - \sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{(z+1)^2}} \sqrt{z+1} \tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right)$  and  $\tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0580.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = \frac{\pi}{2} - \tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z}{z+a}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z}{z+a}}\right)$  and  $\tan^{-1}\left(\sqrt{\frac{z}{a}}\right)$

01.12.27.0581.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \tan^{-1}(\sqrt{z}) ; z \notin (-\infty, -1)$$

01.12.27.0582.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \pi - \tan^{-1}(\sqrt{z}) ; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0050.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \frac{1}{2}\left(\pi - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \left(\pi - 2 \tan^{-1}(\sqrt{z})\right)\right)$$

01.12.27.0583.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{a+z}}\right) = \frac{\sqrt{a+z}}{2\sqrt{z}} \sqrt{\frac{z}{a+z}} \left(\pi - \sqrt{\frac{a}{a+z}} \sqrt{\frac{z}{a} + 1} \left(\pi - 2 \tan^{-1}\left(\sqrt{\frac{z}{a}}\right)\right)\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$  and  $\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0049.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \frac{\pi}{2} - \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) /; |\arg(z)| < \pi$$

01.12.27.0584.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0585.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = -\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0586.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \frac{\pi}{2} \sqrt{1 + \frac{1}{z}} \sqrt{\frac{z}{z+1}} - \sqrt{z+1} \sqrt{\frac{1}{z+1}} \tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$  and  $\tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0587.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \frac{\pi}{2} - \tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; z \notin (-1, 0)$$

01.12.27.0588.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \tan^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0589.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \frac{\pi}{2} \sqrt{1 + \frac{1}{z}} \sqrt{\frac{z}{z+1}} - \sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{z+1}} \tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right)$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right)$  and  $\tan^{-1}(z)$

01.12.27.0054.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \frac{\pi}{2} - \tan^{-1}(z) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0590.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \tan^{-1}(z) + \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0055.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \frac{\pi}{2} - \frac{\sqrt{z^2}}{z} \tan^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right)$  and  $\tan^{-1}\left(\frac{1}{z}\right)$

01.12.27.0591.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = -\tan^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) < 0 \vee (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0592.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \tan^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) > 0 \vee (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.0593.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \pi - \tan^{-1}\left(\frac{1}{z}\right) /; (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.0594.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \tan^{-1}\left(\frac{1}{z}\right) + \pi /; (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.0595.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \frac{\sqrt{z^2}}{z} \tan^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \left( \frac{\sqrt{-i z - 1}}{\sqrt{i z + 1}} + \frac{\sqrt{i z - 1}}{\sqrt{1 - i z}} \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right)$  and  $\tan^{-1}(z)$

01.12.27.0596.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \frac{\pi}{2} - \tan^{-1}(z) /; \operatorname{Re}(z) > 0 \vee (i z \in \mathbb{R} \wedge -1 < i z < 0)$$

01.12.27.0597.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \tan^{-1}(z) + \frac{\pi}{2} /; \operatorname{Re}(z) < 0 \vee (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.0598.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \tan^{-1}(z) - \frac{\pi}{2} /; (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.0599.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = -\tan^{-1}(z) - \frac{\pi}{2} /; (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0600.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \sqrt{\frac{1}{z^2+1}} \sqrt{z^2+1} \left(\frac{\pi}{2} - \frac{\sqrt{z^2}}{z} \tan^{-1}(z)\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right)$  and  $\tan^{-1}\left(\frac{1}{z}\right)$

01.12.27.0601.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \tan^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) > 0 \vee (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0602.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = -\tan^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) < 0 \vee (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.0603.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \pi - \tan^{-1}\left(\frac{1}{z}\right) /; (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.0604.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \tan^{-1}\left(\frac{1}{z}\right) + \pi /; (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.0605.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \sqrt{\frac{1}{z^2+1}} \sqrt{z^2+1} \left( \frac{\sqrt{z^2}}{z} \tan^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \left( \frac{\sqrt{-iz-1}}{\sqrt{iz+1}} + \frac{\sqrt{iz-1}}{\sqrt{1-iz}} \right) \right)$$

### Involving $\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right)$

#### Involving $\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right)$ and $\tan^{-1}(z)$

01.12.27.0056.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \tan^{-1}(z) ; iz \notin (-\infty, -1) \wedge iz \notin (1, \infty)$$

01.12.27.0606.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \pi - \tan^{-1}(z) ; (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0607.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = -\tan^{-1}(z) - \pi ; (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0057.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \frac{\pi}{2} \left( \sqrt{\frac{1}{1-iz}} \sqrt{1-iz} - \sqrt{\frac{1}{iz+1}} \sqrt{iz+1} \right) + \sqrt{\frac{1}{z^2+1}} \sqrt{z^2+1} \tan^{-1}(z)$$

#### Involving $\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right)$ and $\tan^{-1}\left(\frac{1}{z}\right)$

01.12.27.0608.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \frac{\pi}{2} - \tan^{-1}\left(\frac{1}{z}\right) ; \operatorname{Re}(z) > 0 \vee (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0609.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = -\tan^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} ; \operatorname{Re}(z) < 0 \vee (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0610.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \tan^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} ; (iz \in \mathbb{R} \wedge iz > 1)$$



01.12.27.0611.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \tan^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} \text{ ; } (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.0612.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \frac{\pi z}{2\sqrt{z^2+1}} \sqrt{1 + \frac{1}{z^2}} - \sqrt{\frac{1}{z^2+1}} \sqrt{z^2+1} \tan^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right)$

#### Involving $\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right)$ and $\tan^{-1}(z)$

01.12.27.0613.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \tan^{-1}(z) \text{ ; } \operatorname{Re}(z) > 0 \vee (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.0614.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = -\tan^{-1}(z) \text{ ; } \operatorname{Re}(z) < 0 \vee (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.0615.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \pi - \tan^{-1}(z) \text{ ; } (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.0616.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \tan^{-1}(z) + \pi \text{ ; } (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0617.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \frac{\pi}{2} \left(1 - \sqrt{\frac{1}{z^2+1}} \sqrt{z^2+1}\right) + \frac{\sqrt{z^2+1} \sqrt{z^2}}{z} \sqrt{\frac{1}{z^2+1}} \tan^{-1}(z)$$

#### Involving $\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right)$ and $\tan^{-1}\left(\frac{1}{z}\right)$

01.12.27.0618.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \frac{\pi}{2} - \tan^{-1}\left(\frac{1}{z}\right) \text{ ; } \operatorname{Re}(z) > 0 \vee (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0619.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \tan^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} ; \operatorname{Re}(z) < 0 \vee (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.0620.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = -\tan^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} ; (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.0621.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \tan^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} ; (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.0622.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \frac{\sqrt{z^2}}{\sqrt{z^2+1}} \sqrt{\frac{z^2+1}{z^2}} \left( \frac{\pi}{2} - z \sqrt{\frac{1}{z^2}} \tan^{-1}\left(\frac{1}{z}\right) \right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right)$

### Involving $\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right)$ and $\tan^{-1}(z)$

01.12.27.0623.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = -\tan^{-1}(z) ; \operatorname{Re}(z) < 0 \vee (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.0624.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = \tan^{-1}(z) ; \operatorname{Re}(z) > 0 \vee (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.0625.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = \tan^{-1}(z) + \pi ; (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0626.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = \pi - \tan^{-1}(z) ; (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.0627.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = z \sqrt{\frac{1}{z^2}} \tan^{-1}(z) - \frac{1}{2} \pi \left( \sqrt{\frac{1}{i z + 1}} \sqrt{i z + 1} + \sqrt{\frac{1}{1 - i z}} \sqrt{1 - i z} - 2 \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right)$  and  $\tan^{-1}\left(\frac{1}{z}\right)$

01.12.27.0628.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = \tan^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0629.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = \frac{\pi}{2} - \tan^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0630.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = \frac{\pi}{2} - z \sqrt{\frac{1}{z^2}} \tan^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right)$  and  $\tan^{-1}(z)$

01.12.27.0631.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \tan^{-1}(z) /; \operatorname{Re}(z) > 0 \vee (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0632.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = -\tan^{-1}(z) /; \operatorname{Re}(z) < 0 \vee (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0633.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \pi - \tan^{-1}(z) /; (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0634.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \pi + \tan^{-1}(z) /; (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0635.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\sqrt{z^2}\sqrt{-z^2-1}}{\sqrt{-z^2(z^2+1)}}\left(z\sqrt{\frac{1}{z^2}}\tan^{-1}(z) - \frac{\pi}{2}\left(\sqrt{\frac{1}{iz+1}}\sqrt{iz+1} + \sqrt{\frac{1}{1-iz}}\sqrt{1-iz} - 2\right)\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right)$  and  $\tan^{-1}\left(\frac{1}{z}\right)$

01.12.27.0636.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \tan^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2}; \operatorname{Re}(z) < 0 \vee (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0637.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\pi}{2} - \tan^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) > 0 \vee (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0638.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \tan^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}; (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0639.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = -\tan^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}; (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0640.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\sqrt{z^2}\sqrt{-z^2-1}}{\sqrt{-z^2(z^2+1)}}\left(\frac{\pi}{2} - z\sqrt{\frac{1}{z^2}}\tan^{-1}\left(\frac{1}{z}\right)\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{\sqrt{1+z^2}-1}{\sqrt{2}(1+z^2)^{1/4}}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{\sqrt{1+z^2}-1}{\sqrt{2}(1+z^2)^{1/4}}}\right)$  and  $\tan^{-1}(z)$

01.12.27.0641.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{1+z^2}-1}}{\sqrt{2}(1+z^2)^{1/4}}\right) = \frac{\tan^{-1}(z)}{2}; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

$$\text{01.12.27.0642.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{1+z^2}-1}}{\sqrt{2}(1+z^2)^{1/4}} \right) = -\frac{1}{2} \tan^{-1}(z) /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

$$\text{01.12.27.0059.01} \\ \sin^{-1} \left( \frac{1}{\sqrt{2}} \frac{\sqrt{\sqrt{1+z^2}-1}}{(1+z^2)^{1/4}} \right) = \frac{\sqrt{z^2} \tan^{-1}(z)}{2z}$$

Involving  $\sin^{-1} \left( \frac{\sqrt{\sqrt{1+z^2}-1}}{\sqrt{2}(1+z^2)^{1/4}} \right)$  and  $\tan^{-1}\left(\frac{1}{z}\right)$

$$\text{01.12.27.0643.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{1+z^2}-1}}{\sqrt{2}(1+z^2)^{1/4}} \right) = \frac{\pi}{4} - \frac{1}{2} \tan^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) > 0 \vee (iz \in \mathbb{R} \wedge iz < -1)$$

$$\text{01.12.27.0644.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{1+z^2}-1}}{\sqrt{2}(1+z^2)^{1/4}} \right) = \frac{\pi}{4} + \frac{1}{2} \tan^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) < 0 \vee (iz \in \mathbb{R} \wedge iz > 1)$$

$$\text{01.12.27.0645.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{z^2+1}-1}}{\sqrt{2} \sqrt[4]{z^2+1}} \right) = -\frac{\pi}{4} - \frac{1}{2} \tan^{-1}\left(\frac{1}{z}\right) /; (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

$$\text{01.12.27.0646.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{z^2+1}-1}}{\sqrt{2} \sqrt[4]{z^2+1}} \right) = -\frac{\pi}{4} + \frac{1}{2} \tan^{-1}\left(\frac{1}{z}\right) /; (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

$$\text{01.12.27.0647.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{z^2+1}-1}}{\sqrt{2} \sqrt[4]{z^2+1}} \right) = \frac{1}{4} \pi \sqrt{z^2} \sqrt{\frac{1}{z^2}} \sqrt{\frac{1}{z^2+1}} \sqrt{z^2+1} - \frac{\sqrt{z^2}}{2z} \tan^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{\sqrt{1+z^2}-z}}{\sqrt{2}(1+z^2)^{1/4}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{\sqrt{1+z^2}-z}}{\sqrt{2}(1+z^2)^{1/4}}\right)$  and  $\tan^{-1}(z)$

01.12.27.0648.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2+1}-z}}{\sqrt{2}\sqrt[4]{z^2+1}}\right) = \frac{\pi}{4} - \frac{1}{2}\tan^{-1}(z); i z \notin (1, \infty)$$

01.12.27.0649.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2+1}-z}}{\sqrt{2}\sqrt[4]{z^2+1}}\right) = \frac{1}{2}\tan^{-1}(z) + \frac{3\pi}{4}; (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0650.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{1+z^2}-z}}{\sqrt{2}(1+z^2)^{1/4}}\right) = \frac{1}{4}\pi\left(2 - \sqrt{1-iz}\sqrt{\frac{1}{1-iz}}\right) - \frac{1}{2}\sqrt{1-iz}\sqrt{\frac{1}{1-iz}}\tan^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{\sqrt{1+z^2}-z}}{\sqrt{2}(1+z^2)^{1/4}}\right)$  and  $\tan^{-1}\left(\frac{1}{z}\right)$

01.12.27.0651.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2+1}-z}}{\sqrt{2}\sqrt[4]{z^2+1}}\right) = \frac{1}{2}\tan^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) > 0 \vee (i z \in \mathbb{R} \wedge 0 < i z < 1) \vee (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.0652.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2+1}-z}}{\sqrt{2}\sqrt[4]{z^2+1}}\right) = \frac{\pi}{2} + \frac{1}{2}\tan^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) < 0 \vee (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.0653.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2+1}-z}}{\sqrt{2}\sqrt[4]{z^2+1}} \right) = \frac{1}{4}\pi \left( 1 - \frac{\sqrt{z^2}}{z} \right) + \frac{1}{2} \tan^{-1} \left( \frac{1}{z} \right); z \notin (-1, \infty)$$

01.12.27.0654.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2+1}-z}}{\sqrt{2}\sqrt[4]{z^2+1}} \right) = \frac{\pi}{4} \left( -\sqrt{\frac{z}{z-i}} \sqrt{\frac{z-i}{z}} + \sqrt{\frac{z}{z+i}} \sqrt{\frac{z+i}{z}} - \frac{\sqrt{z^2}}{z} + 1 \right) + \frac{1}{2} \sqrt{\frac{1}{1-iz}} \sqrt{1-iz} \tan^{-1} \left( \frac{1}{z} \right)$$

Involving  $\sin^{-1} \left( \sqrt{\left( \sqrt{1+z^2} - 1 \right) / \left( 2\sqrt{1+z^2} \right)} \right)$

Involving  $\sin^{-1} \left( \sqrt{\left( \sqrt{1+z^2} - 1 \right) / \left( 2\sqrt{1+z^2} \right)} \right)$  and  $\tan^{-1}(z)$

01.12.27.0060.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{1+z^2}-1}{2\sqrt{1+z^2}}} \right) = \frac{\tan^{-1}(z)}{2}; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0655.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{1+z^2}-1}{2\sqrt{1+z^2}}} \right) = -\frac{1}{2} \tan^{-1}(z); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0061.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{1+z^2}-1}{2\sqrt{1+z^2}}} \right) = \frac{\sqrt{z^2} \tan^{-1}(z)}{2z}$$

Involving  $\sin^{-1} \left( \sqrt{\left( \sqrt{z^2+1} - 1 \right) / \left( 2\sqrt{z^2+1} \right)} \right)$  and  $\tan^{-1}\left(\frac{1}{z}\right)$

01.12.27.0656.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{z^2+1}-1}{2\sqrt{z^2+1}}} \right) = \frac{\pi}{4} - \frac{1}{2} \tan^{-1} \left( \frac{1}{z} \right); \operatorname{Re}(z) > 0 \vee (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0657.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-1}{2\sqrt{z^2+1}}}\right) = \frac{1}{2}\tan^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{4}; \operatorname{Re}(z) < 0 \vee (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0658.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-1}{2\sqrt{z^2+1}}}\right) = -\frac{\pi}{4} + \frac{1}{2}\tan^{-1}\left(\frac{1}{z}\right); (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0659.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-1}{2\sqrt{z^2+1}}}\right) = -\frac{\pi}{4} - \frac{1}{2}\tan^{-1}\left(\frac{1}{z}\right); (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0660.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-1}{2\sqrt{z^2+1}}}\right) = \frac{\pi}{4}\sqrt{z^2}\sqrt{\frac{1}{z^2}}\sqrt{\frac{1}{z^2+1}}\sqrt{z^2+1} - \frac{\sqrt{z^2}}{2z}\tan^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{\sqrt{1+z^2}-z}{2\sqrt{1+z^2}}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{\sqrt{1+z^2}-z}{2\sqrt{1+z^2}}}\right)$  and  $\tan^{-1}(z)$

01.12.27.0661.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = \frac{\pi}{4} - \frac{1}{2}\tan^{-1}(z); iz \notin (-\infty, -1) \wedge iz \notin (1, \infty)$$

01.12.27.0662.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{1+z^2}-z}{2\sqrt{1+z^2}}}\right) = \frac{1}{2}\tan^{-1}(z) + \frac{3\pi}{4}; (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0663.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{1+z^2}-z}{2\sqrt{1+z^2}}}\right) = \frac{1}{2}\tan^{-1}(z) - \frac{\pi}{4}; (iz \in \mathbb{R} \wedge iz < -1)$$



01.12.27.0664.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = \frac{1}{4}\pi\left(2-\sqrt{1-iz}\sqrt{\frac{1}{1-iz}}\right)\sqrt{iz+1}\sqrt{\frac{1}{iz+1}} - \frac{1}{2}\sqrt{z^2+1}\sqrt{\frac{1}{z^2+1}}\tan^{-1}(z)$$

Involving  $\sin^{-1}\left(\sqrt{\left(\sqrt{z^2+1}-z\right)/\left(2\sqrt{z^2+1}\right)}\right)$  and  $\tan^{-1}\left(\frac{1}{z}\right)$

01.12.27.0665.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = \frac{1}{2}\tan^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) > 0 \vee (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0666.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = \frac{\pi}{2} + \frac{1}{2}\tan^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) < 0 \vee (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0667.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = \frac{\pi}{2} - \frac{1}{2}\tan^{-1}\left(\frac{1}{z}\right); (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0668.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = -\frac{1}{2}\tan^{-1}\left(\frac{1}{z}\right); (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0669.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = \frac{1}{2}\tan^{-1}\left(\frac{1}{z}\right) + \frac{1}{4}\pi\left(-\frac{\sqrt{z^2}}{z} + 1\right); \operatorname{Re}(z) \neq 0$$

01.12.27.0670.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = \frac{1}{2}\sqrt{z^2+1}\sqrt{\frac{1}{z^2+1}}\tan^{-1}\left(\frac{1}{z}\right) + \frac{1}{4}\pi\left(-\sqrt{\frac{1}{z^2}}z + \sqrt{\frac{1}{iz+1}}\sqrt{iz+1} - \sqrt{\frac{1}{1-iz}}\sqrt{1-iz} + 1\right)$$

Involving  $\sin^{-1}\left(\frac{rz^c}{\sqrt{r^2z^{2c}+1}}\right)$

Involving  $\sin^{-1}\left(\frac{az^c}{\sqrt{a^2z^{2c}+1}}\right)$  and  $\tan^{-1}(az^c)$

01.12.27.0671.01

$$\sin^{-1}\left(\frac{az^c}{\sqrt{a^2z^{2c}+1}}\right) = \frac{\pi}{2} \left( -\sqrt{\frac{1}{ai z^c+1}} \sqrt{ai z^c+1} + \sqrt{\frac{1}{1-ia z^c}} \sqrt{1-ia z^c} \right) + \tan^{-1}(az^c) \sqrt{\frac{1}{a^2z^{2c}+1}} \sqrt{a^2z^{2c}+1}$$

### Involving $\sin^{-1}\left(\frac{1}{\sqrt{az^c+1}}\right)$

Involving  $\sin^{-1}(1/\sqrt{az^c+1})$  and  $\tan^{-1}\left(\frac{1}{\sqrt{a}z^{c/2}}\right)$

01.12.27.0672.01

$$\sin^{-1}\left(\frac{1}{\sqrt{az^c+1}}\right) = \frac{\sqrt{a}z^{c/2}}{\sqrt{az^c}} \tan^{-1}\left(\frac{1}{\sqrt{a}z^{c/2}}\right) - \frac{\pi i}{2} \left( \frac{\sqrt{-i\sqrt{a}\sqrt{z^c}-1}}{\sqrt{i\sqrt{a}\sqrt{z^c}+1}} + \frac{\sqrt{i\sqrt{a}\sqrt{z^c}-1}}{\sqrt{1-i\sqrt{a}\sqrt{z^c}}} \right)$$

### Involving $\cot^{-1}$

### Involving $\sin^{-1}(z)$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right)$

01.12.27.0673.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \cot^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right); -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0674.01

$$\sin^{-1}(z) = -\cot^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right) - \frac{\pi}{2}; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0675.01

$$\sin^{-1}(z) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2}} - \cot^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right)$

01.12.27.0676.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \cot^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right); \operatorname{Re}(z) > 0$$

01.12.27.0677.01

$$\sin^{-1}(z) = \cot^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right) - \frac{\pi}{2}; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0678.01

$$\sin^{-1}(z) = -\cot^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right) - \frac{\pi}{2}; (i z \in \mathbb{R} \wedge i z < 0)$$

01.12.27.0679.01

$$\sin^{-1}(z) = \cot^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right) + \frac{\pi}{2}; (i z \in \mathbb{R} \wedge i z > 0)$$

01.12.27.0680.01

$$\sin^{-1}(z) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2} - \frac{\sqrt{z^2}}{z}} \cot^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right)$

01.12.27.0681.01

$$\sin^{-1}(z) = \cot^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right) + \frac{\pi}{2}; 0 < \arg(z) < \frac{\pi}{2} \vee -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0682.01

$$\sin^{-1}(z) = -\cot^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right) - \frac{\pi}{2}; \frac{\pi}{2} < \arg(z) < \pi \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0683.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \cot^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right); (z \in \mathbb{R} \wedge 0 < z < 1) \vee (i z \in \mathbb{R} \wedge i z > 0)$$

01.12.27.0684.01

$$\sin^{-1}(z) = \cot^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge -1 < z < 0) \vee (i z \in \mathbb{R} \wedge i z < 0)$$

01.12.27.0685.01

$$\sin^{-1}(z) = \frac{\pi}{2} \sqrt{\frac{1}{z^2}} z + \frac{\sqrt{-z^2} \sqrt{z^2-1}}{z \sqrt{1-z^2}} \cot^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right)$

01.12.27.0686.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \cot^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right); \operatorname{Re}(z) > 0 \wedge z \notin (1, \infty)$$

01.12.27.0687.01

$$\sin^{-1}(z) = \cot^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right) - \frac{\pi}{2}; \operatorname{Re}(z) < 0 \wedge z \notin (-\infty, -1)$$

01.12.27.0688.01

$$\sin^{-1}(z) = \cot^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right) + \frac{\pi}{2}; (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0689.01

$$\sin^{-1}(z) = -\cot^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right) - \frac{\pi}{2}; (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0690.01

$$\sin^{-1}(z) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2} - \frac{z\sqrt{1-z^2}}{\sqrt{z^2}}} \sqrt{\frac{1}{1-z^2}} \cot^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right)$

01.12.27.0063.01

$$\sin^{-1}(z) = \cot^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right); z \notin (-\infty, -1) \wedge z \notin (1, \infty)$$

01.12.27.0691.01

$$\sin^{-1}(z) = \cot^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right) + \pi; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0692.01

$$\sin^{-1}(z) = \cot^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right) - \pi; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0064.01

$$\sin^{-1}(z) = \cot^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right) - \frac{\pi}{2} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right)$

01.12.27.0693.01

$$\sin^{-1}(z) = \cot^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2} \wedge z \notin (1, \infty)$$

01.12.27.0694.01

$$\sin^{-1}(z) = -\cot^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right) /; \frac{\pi}{2} < \arg(z) < \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0695.01

$$\sin^{-1}(z) = -\cot^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0696.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{z} \cot^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right) - \frac{\pi}{2} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right)$

01.12.27.0697.01

$$\sin^{-1}(z) = \cot^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right) /; \frac{\pi}{2} < \arg(z) < \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0698.01

$$\sin^{-1}(z) = -\cot^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \vee 0 < \arg(z) \leq \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0699.01

$$\sin^{-1}(z) = \pi - \cot^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0700.01

$$\sin^{-1}(z) = -\pi + \cot^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right) /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0701.01

$$\sin^{-1}(z) = -\frac{\sqrt{-z^2} \sqrt{z^2-1}}{z \sqrt{1-z^2}} \cot^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right) - \frac{\pi}{2} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right)$

01.12.27.0702.01

$$\sin^{-1}(z) = \cot^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2} \wedge z \notin (1, \infty)$$

01.12.27.0703.01

$$\sin^{-1}(z) = -\cot^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right) /; \frac{\pi}{2} \leq \arg(z) < \pi \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0704.01

$$\sin^{-1}(z) = \cot^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right) + \pi /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0705.01

$$\sin^{-1}(z) = -\cot^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0706.01

$$\sin^{-1}(z) = \sqrt{\frac{1}{z^2}} z \cot^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right) - \frac{1}{2} \pi \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1}\left(\frac{2z\sqrt{1-z^2}}{1-2z^2}\right)$

01.12.27.0707.01

$$\sin^{-1}(z) = \frac{\pi}{4} - \frac{1}{2} \cot^{-1}\left(\frac{2z\sqrt{1-z^2}}{1-2z^2}\right) /; -\frac{\pi}{2} \leq \arg(z) < 0 \vee 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0708.01

$$\sin^{-1}(z) = -\frac{\pi}{4} - \frac{1}{2} \cot^{-1}\left(\frac{2z\sqrt{1-z^2}}{1-2z^2}\right) /; \frac{\pi}{2} \leq \arg(z) < \pi \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0709.01

$$\sin^{-1}(z) = -\frac{1}{2} \cot^{-1}\left(\frac{2z\sqrt{1-z^2}}{1-2z^2}\right) - \frac{3\pi}{4} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0710.01

$$\sin^{-1}(z) = -\frac{1}{2} \cot^{-1}\left(\frac{2z\sqrt{1-z^2}}{1-2z^2}\right) + \frac{3\pi}{4} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0711.01

$$\sin^{-1}(z) = \frac{\pi}{4} \left( -\sqrt{\frac{1}{1-z}} \sqrt{1-z} + \sqrt{\frac{1}{z+1}} \sqrt{z+1} - \sqrt{-iz} \sqrt{\frac{i}{z}} + \sqrt{-\frac{i}{z}} \sqrt{iz} + \frac{\sqrt{z^2}}{z} \right) - \frac{1}{2} \cot^{-1} \left( \frac{2z\sqrt{1-z^2}}{1-2z^2} \right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1} \left( \frac{1-2z^2}{2z\sqrt{1-z^2}} \right)$

01.12.27.0065.01

$$\sin^{-1}(z) = \frac{1}{2} \cot^{-1} \left( \frac{1-2z^2}{2z\sqrt{1-z^2}} \right) /; \frac{\pi}{4} \leq |\arg(z)| < \frac{3\pi}{4}$$

01.12.27.0712.01

$$\sin^{-1}(z) = \frac{\pi}{4} \left( \frac{\sqrt{z^2-1} z}{\sqrt{z^4-z^2}} + \sqrt{\frac{1}{z}} \sqrt{\frac{1}{\sqrt{2}z-1}} \sqrt{\sqrt{2}z-1} \sqrt{z} - \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{-\sqrt{2}z-1} \sqrt{-\frac{1}{\sqrt{2}z+1}} + \frac{\sqrt{z^2}}{z} \right) + \frac{1}{2} \cot^{-1} \left( \frac{1-2z^2}{2z\sqrt{1-z^2}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1} \left( \frac{\sqrt{1-z}}{\sqrt{1+z}} \right)$

01.12.27.0713.01

$$\sin^{-1}(z) = 2 \cot^{-1} \left( \frac{\sqrt{1-z}}{\sqrt{z+1}} \right) - \frac{\pi}{2} /; z \notin (1, \infty)$$

01.12.27.0714.01

$$\sin^{-1}(z) = 2 \cot^{-1} \left( \frac{\sqrt{1-z}}{\sqrt{z+1}} \right) + \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0715.01

$$\sin^{-1}(z) = 2 \cot^{-1} \left( \frac{\sqrt{1-z}}{\sqrt{1+z}} \right) + \frac{\pi \sqrt{z-1} \sqrt{z}}{\sqrt{1-z}} \sqrt{-\frac{1}{z}} + \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1} \left( \frac{\sqrt{z-1}}{\sqrt{-z-1}} \right)$

01.12.27.0716.01

$$\sin^{-1}(z) = -2 \cot^{-1} \left( \frac{\sqrt{z-1}}{\sqrt{-z-1}} \right) - \frac{\pi}{2} /; z \notin (-1, \infty)$$

01.12.27.0717.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + 2 \cot^{-1} \left( \frac{\sqrt{z-1}}{\sqrt{-z-1}} \right) /; (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.0718.01

$$\sin^{-1}(z) = \frac{3\pi}{2} - 2 \cot^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{-z-1}}\right); (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0719.01

$$\sin^{-1}(z) = \pi \left( \frac{1}{2} - \sqrt{1-z} \sqrt{\frac{1}{1-z}} \right) + \frac{2\sqrt{z-1}\sqrt{z+1}}{\sqrt{-z-1}\sqrt{1-z}} \cot^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{-z-1}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1}\left(\sqrt{\frac{1-z}{1+z}}\right)$

01.12.27.0720.01

$$\sin^{-1}(z) = 2 \cot^{-1}\left(\sqrt{\frac{1-z}{z+1}}\right) - \frac{\pi}{2}; z \notin (-\infty, -1) \wedge z \notin (1, \infty)$$

01.12.27.0721.01

$$\sin^{-1}(z) = 2 \cot^{-1}\left(\sqrt{\frac{1-z}{z+1}}\right) + \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0722.01

$$\sin^{-1}(z) = -2 \cot^{-1}\left(\sqrt{\frac{1-z}{z+1}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0723.01

$$\sin^{-1}(z) = \pi \left( \frac{1}{2} - \sqrt{1-z} \sqrt{\frac{1}{1-z}} \right) + 2 \sqrt{\frac{1}{z+1}} \sqrt{z+1} \cot^{-1}\left(\sqrt{\frac{1-z}{z+1}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1}\left(\frac{\sqrt{1+z}}{\sqrt{1-z}}\right)$

01.12.27.0724.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2 \cot^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{1-z}}\right); z \notin (-\infty, -1)$$

01.12.27.0725.01

$$\sin^{-1}(z) = -2 \cot^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{1-z}}\right) - \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0726.01

$$\sin^{-1}(z) = -2 \cot^{-1}\left(\frac{\sqrt{1+z}}{\sqrt{1-z}}\right) - \frac{\pi\sqrt{-z-1}\sqrt{-z}}{\sqrt{z+1}} \sqrt{\frac{1}{z}} - \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{z-1}}\right)$



01.12.27.0727.01

$$\sin^{-1}(z) = \frac{\pi}{2} + 2 \cot^{-1} \left( \frac{\sqrt{-z-1}}{\sqrt{z-1}} \right) ; z \notin (-\infty, 1)$$

01.12.27.0728.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2 \cot^{-1} \left( \frac{\sqrt{-z-1}}{\sqrt{z-1}} \right) ; (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.0729.01

$$\sin^{-1}(z) = -\frac{3\pi}{2} + 2 \cot^{-1} \left( \frac{\sqrt{-z-1}}{\sqrt{z-1}} \right) ; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0730.01

$$\sin^{-1}(z) = \pi \left( -\frac{1}{2} + \sqrt{z+1} \sqrt{\frac{1}{z+1}} \right) - \frac{2\sqrt{z-1}\sqrt{z+1}}{\sqrt{-z-1}\sqrt{1-z}} \cot^{-1} \left( \frac{\sqrt{-z-1}}{\sqrt{z-1}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1} \left( \sqrt{\frac{1+z}{1-z}} \right)$

01.12.27.0731.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2 \cot^{-1} \left( \sqrt{\frac{z+1}{1-z}} \right) ; z \notin (-\infty, -1) \wedge z \notin (1, \infty)$$

01.12.27.0732.01

$$\sin^{-1}(z) = 2 \cot^{-1} \left( \sqrt{\frac{1+z}{1-z}} \right) + \frac{\pi}{2} ; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0733.01

$$\sin^{-1}(z) = -2 \cot^{-1} \left( \sqrt{\frac{z+1}{1-z}} \right) - \frac{3\pi}{2} ; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0734.01

$$\sin^{-1}(z) = \pi \left( -\frac{1}{2} + \sqrt{z+1} \sqrt{\frac{1}{z+1}} \right) - 2 \sqrt{\frac{1}{1-z}} \sqrt{1-z} \cot^{-1} \left( \sqrt{\frac{z+1}{1-z}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1} \left( \frac{1+\sqrt{1-z^2}}{z} \right)$

01.12.27.0735.01

$$\sin^{-1}(z) = 2 \cot^{-1} \left( \frac{1+\sqrt{1-z^2}}{z} \right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1} \left( \frac{1-\sqrt{1-z^2}}{z} \right)$

01.12.27.0736.01

$$\sin^{-1}(z) = \pi - 2 \cot^{-1} \left( \frac{1 - \sqrt{1 - z^2}}{z} \right) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0737.01

$$\sin^{-1}(z) = -2 \cot^{-1} \left( \frac{1 - \sqrt{1 - z^2}}{z} \right) - \pi /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0738.01

$$\sin^{-1}(z) = \pi \sqrt{\frac{1}{z^2}} z - 2 \cot^{-1} \left( \frac{1 - \sqrt{1 - z^2}}{z} \right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1} \left( \frac{z}{1 + \sqrt{1 - z^2}} \right)$

01.12.27.0739.01

$$\sin^{-1}(z) = \pi - 2 \cot^{-1} \left( \frac{z}{1 + \sqrt{1 - z^2}} \right) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0740.01

$$\sin^{-1}(z) = -2 \cot^{-1} \left( \frac{z}{1 + \sqrt{1 - z^2}} \right) - \pi /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0741.01

$$\sin^{-1}(z) = \pi \sqrt{\frac{1}{z^2}} z - 2 \cot^{-1} \left( \frac{z}{1 + \sqrt{1 - z^2}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\cot^{-1} \left( \frac{z}{1 - \sqrt{1 - z^2}} \right)$

01.12.27.0742.01

$$\sin^{-1}(z) = 2 \cot^{-1} \left( \frac{z}{1 - \sqrt{1 - z^2}} \right)$$

Involving  $\sin^{-1} \left( \frac{2z}{z^2 + 1} \right)$

Involving  $\sin^{-1} \left( \frac{2z}{z^2 + 1} \right)$  and  $\cot^{-1}(z)$

01.12.27.0743.01

$$\sin^{-1} \left( \frac{2z}{z^2 + 1} \right) = \pi - 2 \cot^{-1}(z) /; |z| < 1 \wedge -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0744.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = -2 \cot^{-1}(z) - \pi /; |z| < 1 \wedge \left(\frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}\right)$$

01.12.27.0745.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \pi z \sqrt{\frac{1}{z^2}} - 2 \cot^{-1}(z) /; |z| < 1$$

01.12.27.0067.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = 2 \cot^{-1}(z) /; |z| > 1$$

01.12.27.0746.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2} \left( \frac{1-z}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2 + 1} \right)} - \frac{2(1-z)}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2} \cot^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{2z}{z^2+1}\right)$  and  $\cot^{-1}\left(\frac{1}{z}\right)$

01.12.27.0066.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = 2 \cot^{-1}\left(\frac{1}{z}\right) /; |z| < 1$$

01.12.27.0747.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \pi - 2 \cot^{-1}\left(\frac{1}{z}\right) /; |z| > 1 \wedge -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0748.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = -2 \cot^{-1}\left(\frac{1}{z}\right) - \pi /; |z| > 1 \wedge \left(\frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}\right)$$

01.12.27.0749.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \frac{\pi \sqrt{z^2}}{z} - 2 \cot^{-1}\left(\frac{1}{z}\right) /; |z| > 1$$

01.12.27.0750.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \frac{\pi \sqrt{z^2}}{2z} \left( 1 - \frac{1-z}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2} \right) + \frac{2(1-z)}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2} \cot^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{2z}{z^2+1}\right)$  and  $\cot^{-1}(z^r)$

01.12.27.0751.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = 2 \cot^{-1}\left( z \frac{\sqrt{\left(\frac{z+1}{z-1}\right)^2}}{z+1} \right)$$

### Involving $\sin^{-1}\left(\frac{1-z}{1+z}\right)$

#### Involving $\sin^{-1}\left(\frac{1-z}{1+z}\right)$ and $\cot^{-1}(\sqrt{z})$

01.12.27.0752.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = 2 \cot^{-1}(\sqrt{z}) - \frac{\pi}{2}; |\arg(z)| < \pi$$

01.12.27.0753.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = -2 \cot^{-1}(\sqrt{z}) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0754.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = 2 \cot^{-1}(\sqrt{z}) + \frac{3\pi}{2}; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0755.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{\pi}{2} \left( -2 \sqrt{\frac{1}{z}} \sqrt{z} + 2 \sqrt{\frac{1}{z+1}} \sqrt{z+1} - 1 \right) + 2 \sqrt{\frac{1}{z+1}} \sqrt{z+1} \cot^{-1}(\sqrt{z})$$

#### Involving $\sin^{-1}\left(\frac{1-z}{1+z}\right)$ and $\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0756.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{\pi}{2} - 2 \cot^{-1}\left(\frac{1}{\sqrt{z}}\right); z \notin (-\infty, -1)$$

01.12.27.0757.01

$$\sin^{-1}\left(\frac{1-z}{z+1}\right) = 2 \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0758.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \left( \sqrt{z+1} \sqrt{\frac{1}{z+1}} - \frac{1}{2} \right) \pi - 2 \sqrt{z+1} \sqrt{\frac{1}{z+1}} \cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

#### Involving $\sin^{-1}\left(\frac{1-z}{1+z}\right)$ and $\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0759.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{\pi}{2} - 2 \cot^{-1}\left(\sqrt{\frac{1}{z}}\right); |\arg(z)| < \pi$$

01.12.27.0760.01

$$\sin^{-1}\left(\frac{1-z}{z+1}\right) = 2 \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2}; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0761.01

$$\sin^{-1}\left(\frac{1-z}{z+1}\right) = -2 \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0762.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \left(\sqrt{z+1} \sqrt{\frac{1}{z+1}} - \frac{1}{2}\right)\pi - 2\sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{z+1}} \cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

### Involving $\sin^{-1}\left(\frac{z-1}{z+1}\right)$

#### Involving $\sin^{-1}\left(\frac{z-1}{z+1}\right)$ and $\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0763.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\frac{\pi}{2} + 2 \cot^{-1}\left(\frac{1}{\sqrt{z}}\right); z \notin (-\infty, -1)$$

01.12.27.0764.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -2 \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0765.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\left(\sqrt{z+1} \sqrt{\frac{1}{z+1}} - \frac{1}{2}\right)\pi + 2\sqrt{z+1} \sqrt{\frac{1}{z+1}} \cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

#### Involving $\sin^{-1}\left(\frac{z-1}{z+1}\right)$ and $\cot^{-1}(\sqrt{z})$

01.12.27.0766.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -2 \cot^{-1}(\sqrt{z}) + \frac{\pi}{2}; |\arg(z)| < \pi$$

01.12.27.0767.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = 2 \cot^{-1}(\sqrt{z}) + \frac{\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0768.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\frac{\pi}{2} \left(-2\sqrt{\frac{1}{z}} \sqrt{z} + 2\sqrt{\frac{1}{z+1}} \sqrt{z+1} - 1\right) - 2\sqrt{\frac{1}{z+1}} \sqrt{z+1} \cot^{-1}(\sqrt{z})$$

#### Involving $\sin^{-1}\left(\frac{z-1}{z+1}\right)$ and $\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0769.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\frac{\pi}{2} + 2 \cot^{-1}\left(\sqrt{\frac{1}{z}}\right); |\arg(z)| < \pi$$

01.12.27.0770.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -2 \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0771.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = 2 \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0772.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\left(\sqrt{z+1} \sqrt{\frac{1}{z+1}} - \frac{1}{2}\right)\pi + 2\sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{z+1}} \cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

### Involving $\sin^{-1}\left(\frac{1+z}{1-z}\right)$

#### Involving $\sin^{-1}\left(\frac{1+z}{1-z}\right)$ and $\cot^{-1}(\sqrt{-z})$

01.12.27.0773.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = 2 \cot^{-1}(\sqrt{-z}) - \frac{\pi}{2} /; z \notin (0, \infty)$$

01.12.27.0774.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = -2 \cot^{-1}(\sqrt{-z}) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0775.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \frac{1}{2}\pi \left(2\sqrt{\frac{1}{1-z}} \sqrt{1-z} - 2\sqrt{-\frac{1}{z}} \sqrt{-z} - 1\right) + 2\sqrt{\frac{1}{1-z}} \sqrt{1-z} \cot^{-1}(\sqrt{-z})$$

#### Involving $\sin^{-1}\left(\frac{1+z}{1-z}\right)$ and $\cot^{-1}\left(\frac{1}{\sqrt{-z}}\right)$

01.12.27.0776.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \frac{\pi}{2} - 2 \cot^{-1}\left(\frac{1}{\sqrt{-z}}\right) /; z \notin (1, \infty)$$

01.12.27.0777.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = 2 \cot^{-1}\left(\frac{1}{\sqrt{-z}}\right) - \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0778.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \left(\sqrt{1-z} \sqrt{\frac{1}{1-z}} - \frac{1}{2}\right)\pi - 2\sqrt{1-z} \sqrt{\frac{1}{1-z}} \cot^{-1}\left(\frac{1}{\sqrt{-z}}\right)$$

#### Involving $\sin^{-1}\left(\frac{1+z}{1-z}\right)$ and $\cot^{-1}\left(\sqrt{-\frac{1}{z}}\right)$

01.12.27.0779.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \frac{\pi}{2} - 2 \cot^{-1}\left(\sqrt{\frac{1}{z}}\right); z \notin (0, \infty)$$

01.12.27.0780.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = 2 \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2}; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0781.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = -2 \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0782.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \left(\sqrt{1-z} \sqrt{\frac{1}{1-z}} - \frac{1}{2}\right) \pi - 2 \sqrt{1-z} \sqrt{\frac{1}{1-z}} \sqrt{-z} \sqrt{\frac{1}{z}} \cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

### Involving $\sin^{-1}\left(\frac{z+1}{z-1}\right)$

#### Involving $\sin^{-1}\left(\frac{z+1}{z-1}\right)$ and $\cot^{-1}(\sqrt{-z})$

01.12.27.0783.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2 \cot^{-1}(\sqrt{-z}) + \frac{\pi}{2}; z \notin (0, \infty)$$

01.12.27.0784.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = 2 \cot^{-1}(\sqrt{-z}) + \frac{\pi}{2}; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0785.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{\pi}{2} \left(-2 \sqrt{-\frac{1}{z}} \sqrt{-z} + 2 \sqrt{\frac{1}{1-z}} \sqrt{1-z} - 1\right) - 2 \sqrt{\frac{1}{1-z}} \sqrt{1-z} \cot^{-1}(\sqrt{-z})$$

#### Involving $\sin^{-1}\left(\frac{z+1}{z-1}\right)$ and $\cot^{-1}\left(\frac{1}{\sqrt{-z}}\right)$

01.12.27.0786.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{\pi}{2} + 2 \cot^{-1}\left(\frac{1}{\sqrt{-z}}\right); z \notin (1, \infty)$$

01.12.27.0787.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2 \cot^{-1}\left(\frac{1}{\sqrt{-z}}\right) + \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0788.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\left(\sqrt{1-z} \sqrt{\frac{1}{1-z}} - \frac{1}{2}\right) \pi + 2 \sqrt{1-z} \sqrt{\frac{1}{1-z}} \cot^{-1}\left(\frac{1}{\sqrt{-z}}\right)$$

Involving  $\sin^{-1}\left(\frac{z+1}{z-1}\right)$  and  $\cot^{-1}\left(\sqrt{-\frac{1}{z}}\right)$

01.12.27.0789.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{\pi}{2} + 2 \cot^{-1}\left(\sqrt{-\frac{1}{z}}\right) /; z \notin (0, \infty)$$

01.12.27.0790.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2 \cot^{-1}\left(\sqrt{-\frac{1}{z}}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0791.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = 2 \cot^{-1}\left(\sqrt{-\frac{1}{z}}\right) + \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0792.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\left(\sqrt{1-z} \sqrt{\frac{1}{1-z}} - \frac{1}{2}\right)\pi + 2\sqrt{1-z} \sqrt{\frac{1}{1-z}} \sqrt{-z} \sqrt{-\frac{1}{z}} \cot^{-1}\left(\sqrt{-\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right)$

Involving  $\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right)$  and  $\cot^{-1}(z)$

01.12.27.0793.01

$$\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right) = 2 \cot^{-1}(z) - \frac{\pi}{2} /; \operatorname{Re}(z) > 0 \vee (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0794.01

$$\sin^{-1}\left(\frac{1-z^2}{z^2+1}\right) = -2 \cot^{-1}(z) - \frac{\pi}{2} /; \operatorname{Re}(z) < 0 \vee (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0795.01

$$\sin^{-1}\left(\frac{1-z^2}{z^2+1}\right) = 2 \cot^{-1}(z) + \frac{3\pi}{2} /; (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0796.01

$$\sin^{-1}\left(\frac{1-z^2}{z^2+1}\right) = \frac{3\pi}{2} - 2 \cot^{-1}(z) /; (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0797.01

$$\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right) =$$

$$\frac{2\sqrt{z^2}}{z} \sqrt{\frac{i-z}{i+z}} \sqrt{\frac{i+z}{i-z}} \cot^{-1}(z) - \frac{\pi}{2} \left( 2\sqrt{-\frac{i}{z}} \sqrt{iz} \sqrt{\frac{1}{iz+1}} \sqrt{iz+1} + 2\sqrt{\frac{i}{z}} \sqrt{-iz} \sqrt{\frac{1}{1-iz}} \sqrt{1-iz} - 3 \right)$$



Involving  $\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right)$  and  $\cot^{-1}\left(\frac{1}{z}\right)$

01.12.27.0068.02

$$\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right) = \frac{\pi}{2} - 2 \cot^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) > 0 \vee 0 < -iz < 1$$

01.12.27.0798.01

$$\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right) = 2 \cot^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2}; \operatorname{Re}(z) < 0 \vee (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0799.01

$$\sin^{-1}\left(\frac{1-z^2}{z^2+1}\right) = -2 \cot^{-1}\left(\frac{1}{z}\right) - \frac{3\pi}{2}; (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0800.01

$$\sin^{-1}\left(\frac{1-z^2}{z^2+1}\right) = 2 \cot^{-1}\left(\frac{1}{z}\right) - \frac{3\pi}{2}; (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0069.01

$$\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right) = \frac{\pi}{2} - \frac{2\sqrt{z^2}}{z} \cot^{-1}\left(\frac{1}{z}\right); iz \notin (-\infty, -1) \wedge iz \notin (1, \infty)$$

01.12.27.0801.01

$$\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right) = \frac{\pi}{2} \left( 2 \sqrt{\frac{1}{iz+1}} \sqrt{iz+1} + 2 \sqrt{\frac{1}{1-iz}} \sqrt{1-iz} - 3 \right) - \frac{2\sqrt{z^2}}{z} \sqrt{\frac{i-z}{i+z}} \sqrt{\frac{i+z}{i-z}} \cot^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right)$

Involving  $\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right)$  and  $\cot^{-1}(z)$

01.12.27.0802.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -2 \cot^{-1}(z) + \frac{\pi}{2}; \operatorname{Re}(z) > 0 \vee (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0803.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = 2 \cot^{-1}(z) + \frac{\pi}{2}; \operatorname{Re}(z) < 0 \vee (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0804.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -2 \cot^{-1}(z) - \frac{3\pi}{2}; (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0805.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -\frac{3\pi}{2} + 2 \cot^{-1}(z); (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0806.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -\frac{2\sqrt{z^2}}{z} \sqrt{\frac{i-z}{i+z}} \sqrt{\frac{i+z}{i-z}} \cot^{-1}(z) + \frac{\pi}{2} \left( 2\sqrt{\frac{i}{z}} \sqrt{i z} \sqrt{\frac{1}{i z+1}} \sqrt{i z+1} + 2\sqrt{\frac{i}{z}} \sqrt{-i z} \sqrt{\frac{1}{1-i z}} \sqrt{1-i z} - 3 \right)$$

Involving  $\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right)$  and  $\cot^{-1}\left(\frac{1}{z}\right)$

01.12.27.0807.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -\frac{\pi}{2} + 2 \cot^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) > 0 \vee (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.0808.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -2 \cot^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}; \operatorname{Re}(z) < 0 \vee (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.0809.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = 2 \cot^{-1}\left(\frac{1}{z}\right) + \frac{3\pi}{2}; (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0810.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -2 \cot^{-1}\left(\frac{1}{z}\right) + \frac{3\pi}{2}; (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.0811.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -\frac{\pi}{2} + \frac{2\sqrt{z^2}}{z} \cot^{-1}\left(\frac{1}{z}\right); i z \notin (-\infty, -1) \wedge i z \notin (1, \infty)$$

01.12.27.0812.01

$$\sin^{-1}\left(\frac{z^2-1}{z^2+1}\right) = -\frac{\pi}{2} \left( 2\sqrt{\frac{1}{i z+1}} \sqrt{i z+1} + 2\sqrt{\frac{1}{1-i z}} \sqrt{1-i z} - 3 \right) + \frac{2\sqrt{z^2}}{z} \sqrt{\frac{i-z}{i+z}} \sqrt{\frac{i+z}{i-z}} \cot^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right)$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right)$  and  $\cot^{-1}(\sqrt{z})$

01.12.27.0813.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = \cot^{-1}(\sqrt{z}); z \notin (-1, 0)$$

01.12.27.0814.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = \cot^{-1}(\sqrt{z}) + \pi; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0815.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = \cot^{-1}(\sqrt{z}) - \frac{\pi}{2} \left( \sqrt{z} \sqrt{\frac{1}{z}} \sqrt{z+1} \sqrt{\frac{1}{z+1} - 1} \right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right)$  and  $\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0070.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = \frac{\pi}{2} - \cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right)$  and  $\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0816.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = \frac{\pi}{2} - \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |\arg(z)| < \pi$$

01.12.27.0817.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = \frac{\pi}{2} + \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0818.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z+1}}\right) = \frac{\pi}{2} - \sqrt{z} \sqrt{\frac{1}{z}} \cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right)$  and  $\cot^{-1}(\sqrt{z})$

01.12.27.0819.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \cot^{-1}(\sqrt{z}) /; |\arg(z)| < \pi$$

01.12.27.0820.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = -\cot^{-1}(\sqrt{z}) /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0821.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \cot^{-1}(\sqrt{z}) + \pi /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0822.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \sqrt{\frac{1}{z+1}} \sqrt{z+1} \left( \cot^{-1}(\sqrt{z}) - \frac{\pi}{2} \left( \sqrt{z} \sqrt{\frac{1}{z}} \sqrt{z+1} \sqrt{\frac{1}{z+1}} - 1 \right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right)$  and  $\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0823.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \frac{\pi}{2} - \cot^{-1}\left(\frac{1}{\sqrt{z}}\right); z \notin (-\infty, -1)$$

01.12.27.0824.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0825.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \sqrt{\frac{1}{z+1}} \sqrt{z+1} \left( \frac{\pi}{2} - \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right)$  and  $\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0826.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \frac{\pi}{2} - \cot^{-1}\left(\sqrt{\frac{1}{z}}\right); |\arg(z)| < \pi$$

01.12.27.0827.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2}; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0828.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = -\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0829.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z+1}}\right) = \frac{1}{2} \pi \sqrt{z+1} \sqrt{\frac{1}{z+1}} - \sqrt{\frac{z}{z+1}} \sqrt{\frac{z+1}{z}} \cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{a+z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right)$  and  $\cot^{-1}(\sqrt{z})$

01.12.27.0830.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \frac{\pi}{2} - \cot^{-1}(\sqrt{z}) \ ; \ |\arg(z)| < \pi$$

01.12.27.0831.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = -\cot^{-1}(\sqrt{z}) - \frac{\pi}{2} \ ; \ (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0832.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \cot^{-1}(\sqrt{z}) + \frac{\pi}{2} \ ; \ (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0833.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \frac{\pi}{2} \sqrt{z} \sqrt{\frac{1}{z}} \sqrt{z+1} \sqrt{\frac{1}{z+1}} - \sqrt{z+1} \sqrt{\frac{1}{z+1}} \cot^{-1}(\sqrt{z})$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right)$  and  $\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0834.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) \ ; \ z \notin (-\infty, -1)$$

01.12.27.0835.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \pi - \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) \ ; \ (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0836.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \frac{1}{2} \left( \pi - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \left( \pi - 2 \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) \right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right)$  and  $\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0837.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) \ ; \ |\arg(z)| < \pi$$

01.12.27.0838.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = -\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) \ ; \ (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0839.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \pi + \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) \ ; \ (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0840.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \frac{1}{2} \left( \pi - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \left( \pi - 2\sqrt{z} \sqrt{\frac{1}{z}} \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) \right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right)$  and  $\cot^{-1}(\sqrt{z})$

01.12.27.0841.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right) = \frac{\pi}{2} - \cot^{-1}(\sqrt{z}) \text{ ; } |\arg(z)| < \pi$$

01.12.27.0842.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right) = \cot^{-1}(\sqrt{z}) + \frac{\pi}{2} \text{ ; } (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0843.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right) = \frac{\pi}{2} - \sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{(z+1)^2}} \sqrt{z+1} \cot^{-1}(\sqrt{z})$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right)$  and  $\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0844.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right) = \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) \text{ ; } |\arg(z)| < \pi$$

01.12.27.0845.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right) = -\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) \text{ ; } (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0846.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right) = \pi - \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) \text{ ; } (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0847.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right) = \frac{1}{2} \sqrt{1 + \frac{1}{z}} \sqrt{\frac{z}{z+1}} \left( \pi - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \left( \pi - 2 \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) \right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right)$  and  $\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0848.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right) = \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) /; z \notin (-\infty, -1)$$

01.12.27.0849.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right) = \pi + \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0850.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-z-1}}\right) = \frac{\pi}{2} \left(1 - \sqrt{z+1} \sqrt{\frac{1}{z+1}}\right) + \cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

## Involving $\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$

### Involving $\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$ and $\cot^{-1}(\sqrt{z})$

01.12.27.0071.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \frac{\pi}{2} - \cot^{-1}(\sqrt{z}) /; |\arg(z)| < \pi$$

01.12.27.0851.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \cot^{-1}(\sqrt{z}) + \frac{\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0852.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = -\cot^{-1}(\sqrt{z}) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0072.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \frac{\pi}{2} \sqrt{1 + \frac{1}{z}} \sqrt{\frac{z}{z+1}} - \sqrt{z+1} \sqrt{\frac{1}{z+1}} \cot^{-1}(\sqrt{z})$$

### Involving $\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$ and $\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0853.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) /; z \notin (-\infty, -1)$$

01.12.27.0854.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \pi - \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0855.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \frac{1}{2} \left( \pi - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \left( \pi - 2 \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) \right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$  and  $\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0856.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |\arg(z)| < \pi$$

01.12.27.0857.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = -\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0858.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \pi + \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0859.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \frac{\pi}{2} \left(1 - \sqrt{\frac{1}{z+1}} \sqrt{z+1}\right) + \sqrt{\frac{z}{z+1}} \sqrt{\frac{z+1}{z}} \cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right)$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right)$  and  $\cot^{-1}(z)$

01.12.27.0075.02

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \cot^{-1}(z) /; \operatorname{Re}(z) > 0 \vee i z < -1$$

01.12.27.0860.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = -\cot^{-1}(z) /; \operatorname{Re}(z) < 0 \vee (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0861.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \pi - \cot^{-1}(z) /; (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.0862.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \cot^{-1}(z) + \pi /; (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$



01.12.27.0076.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \frac{\sqrt{z^2}}{z} \cot^{-1}(z) ; i z \notin (-1, 1)$$

01.12.27.0077.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \frac{\sqrt{z^2}}{z} \cot^{-1}(z) - \frac{\pi i}{2} \left( \frac{\sqrt{-i z - 1}}{\sqrt{i z + 1}} + \frac{\sqrt{i z - 1}}{\sqrt{1 - i z}} \right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right)$  and  $\cot^{-1}\left(\frac{1}{z}\right)$

01.12.27.0863.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \frac{\pi}{2} - \cot^{-1}\left(\frac{1}{z}\right) ; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0864.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \cot^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} ; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0865.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) = \frac{\pi}{2} - \frac{\sqrt{z^2}}{z} \cot^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right)$  and  $\cot^{-1}(z)$

01.12.27.0866.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \cot^{-1}(z) ; \operatorname{Re}(z) > 0 \vee (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0867.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = -\cot^{-1}(z) ; \operatorname{Re}(z) < 0 \vee (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.0868.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \pi - \cot^{-1}(z) ; (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.0869.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \cot^{-1}(z) + \pi /; (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0870.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \frac{\sqrt{z^2}}{z} \cot^{-1}(z) /; \operatorname{Re}(z) \neq 0$$

01.12.27.0871.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \sqrt{\frac{1}{z^2+1}} \sqrt{z^2+1} \left( \frac{\sqrt{z^2}}{z} \cot^{-1}(z) - \frac{\pi i}{2} \left( \frac{\sqrt{-iz-1}}{\sqrt{iz+1}} + \frac{\sqrt{iz-1}}{\sqrt{1-iz}} \right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right)$  and  $\cot^{-1}\left(\frac{1}{z}\right)$

01.12.27.0872.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \frac{\pi}{2} - \cot^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) > 0 \vee (iz \in \mathbb{R} \wedge -1 < iz < 0)$$

01.12.27.0873.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \frac{\pi}{2} + \cot^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) < 0 \vee (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0874.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = -\frac{\pi}{2} + \cot^{-1}\left(\frac{1}{z}\right) /; (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0875.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = -\frac{\pi}{2} - \cot^{-1}\left(\frac{1}{z}\right) /; (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0876.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \frac{\pi}{2} - \frac{\sqrt{z^2}}{z} \cot^{-1}\left(\frac{1}{z}\right) /; iz \notin (-\infty, -1) \wedge iz \notin (1, \infty)$$

01.12.27.0877.01

$$\sin^{-1}\left(\sqrt{\frac{1}{z^2+1}}\right) = \sqrt{\frac{1}{z^2+1}} \sqrt{z^2+1} \left( \frac{\pi}{2} - \frac{\sqrt{z^2}}{z} \cot^{-1}\left(\frac{1}{z}\right) \right)$$

Involving  $\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right)$

Involving  $\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right)$  and  $\cot^{-1}(z)$

01.12.27.0878.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \frac{\pi}{2} - \cot^{-1}(z) ; \operatorname{Re}(z) > 0 \vee (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0879.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = -\cot^{-1}(z) - \frac{\pi}{2} ; \operatorname{Re}(z) < 0 \vee (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0880.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \cot^{-1}(z) - \frac{\pi}{2} ; (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0881.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \cot^{-1}(z) + \frac{\pi}{2} ; (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0882.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \frac{\pi z}{2\sqrt{z^2+1}} \sqrt{1 + \frac{1}{z^2}} - \sqrt{\frac{1}{z^2+1}} \sqrt{z^2+1} \cot^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right)$  and  $\cot^{-1}\left(\frac{1}{z}\right)$

01.12.27.0078.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \cot^{-1}\left(\frac{1}{z}\right) ; iz \notin (-\infty, -1) \wedge iz \notin (1, \infty)$$

01.12.27.0883.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \pi - \cot^{-1}\left(\frac{1}{z}\right) ; (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0884.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = -\cot^{-1}\left(\frac{1}{z}\right) - \pi ; (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0079.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \frac{\pi}{2} \left( \sqrt{\frac{1}{1-iz}} \sqrt{1-iz} - \sqrt{\frac{1}{iz+1}} \sqrt{iz+1} \right) + \sqrt{\frac{1}{z^2+1}} \sqrt{z^2+1} \cot^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right)$

#### Involving $\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right)$ and $\cot^{-1}(z)$

01.12.27.0885.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \frac{\pi}{2} - \cot^{-1}(z) ; \operatorname{Re}(z) > 0 \vee (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0886.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \cot^{-1}(z) + \frac{\pi}{2} ; \operatorname{Re}(z) < 0 \vee (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.0887.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = -\cot^{-1}(z) - \frac{\pi}{2} ; (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.0888.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \cot^{-1}(z) - \frac{\pi}{2} ; (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.0889.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \frac{\sqrt{z^2}}{\sqrt{z^2+1}} \sqrt{\frac{z^2+1}{z^2}} \left( \frac{\pi}{2} - z \sqrt{\frac{1}{z^2}} \cot^{-1}(z) \right)$$

#### Involving $\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right)$ and $\cot^{-1}\left(\frac{1}{z}\right)$

01.12.27.0890.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \cot^{-1}\left(\frac{1}{z}\right) ; \operatorname{Re}(z) > 0 \vee (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.0891.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = -\cot^{-1}\left(\frac{1}{z}\right) ; \operatorname{Re}(z) < 0 \vee (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.0892.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = -\cot^{-1}\left(\frac{1}{z}\right) + \pi ; (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.0893.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \cot^{-1}\left(\frac{1}{z}\right) + \pi /; (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0894.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \frac{\sqrt{z^2}}{\sqrt{z^2+1}} \sqrt{\frac{z^2+1}{z^2}} \left( z \sqrt{\frac{1}{z^2}} \cot^{-1}\left(\frac{1}{z}\right) - \frac{1}{2} \pi \left( \sqrt{\frac{1}{i z+1}} \sqrt{i z+1} + \sqrt{\frac{1}{1-i z}} \sqrt{1-i z} - 2 \right) \right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right)$

#### Involving $\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right)$ and $\cot^{-1}(z)$

01.12.27.0895.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = \cot^{-1}(z) + \frac{\pi}{2} /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0896.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = \frac{\pi}{2} - \cot^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0897.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = \frac{\pi}{2} - z \sqrt{\frac{1}{z^2}} \cot^{-1}(z)$$

#### Involving $\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right)$ and $\cot^{-1}\left(\frac{1}{z}\right)$

01.12.27.0898.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = -\cot^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) < 0 \vee (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.0899.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = \cot^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) > 0 \vee (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.0900.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = \cot^{-1}\left(\frac{1}{z}\right) + \pi /; (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0901.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = \pi - \cot^{-1}\left(\frac{1}{z}\right); (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0902.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right) = z \sqrt{\frac{1}{z^2}} \cot^{-1}\left(\frac{1}{z}\right) - \frac{1}{2} \pi \left( \sqrt{\frac{1}{iz+1}} \sqrt{iz+1} + \sqrt{\frac{1}{1-iz}} \sqrt{1-iz} - 2 \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right)$  and  $\cot^{-1}(z)$

01.12.27.0903.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \cot^{-1}(z) + \frac{\pi}{2}; \operatorname{Re}(z) < 0 \vee (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0904.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\pi}{2} - \cot^{-1}(z); \operatorname{Re}(z) > 0 \vee (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0905.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \cot^{-1}(z) - \frac{\pi}{2}; (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0906.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = -\cot^{-1}(z) - \frac{\pi}{2}; (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0907.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\sqrt{z^2} \sqrt{-z^2-1}}{\sqrt{-z^2(z^2+1)}} \left( \frac{\pi}{2} - z \sqrt{\frac{1}{z^2}} \cot^{-1}(z) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right)$  and  $\cot^{-1}\left(\frac{1}{z}\right)$

01.12.27.0908.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = -\cot^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) < 0 \vee (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0909.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \cot^{-1}\left(\frac{1}{z}\right); \operatorname{Re}(z) > 0 \vee (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0910.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \pi - \cot^{-1}\left(\frac{1}{z}\right); (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0911.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \pi + \cot^{-1}\left(\frac{1}{z}\right); (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0912.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\sqrt{z^2} \sqrt{-z^2-1}}{\sqrt{-z^2(z^2+1)}} \left( z \sqrt{\frac{1}{z^2}} \cot^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} \left( \sqrt{\frac{1}{iz+1}} \sqrt{iz+1} + \sqrt{\frac{1}{1-iz}} \sqrt{1-iz} - 2 \right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{\sqrt{1+z^2}-1}{(\sqrt{2}(1+z^2)^{1/4})}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{\sqrt{1+z^2}-1}{(\sqrt{2}(1+z^2)^{1/4})}}\right)$  and  $\cot^{-1}(z)$

01.12.27.0913.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{1+z^2}-1}}{\sqrt{2}(1+z^2)^{1/4}}\right) = \frac{\pi}{4} - \frac{1}{2} \cot^{-1}(z); \operatorname{Re}(z) > 0 \vee (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0914.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{1+z^2}-1}}{\sqrt{2}(1+z^2)^{1/4}}\right) = \frac{\pi}{4} + \frac{1}{2} \cot^{-1}(z); \operatorname{Re}(z) < 0 \vee (iz \in \mathbb{R} \wedge iz > 1)$$

$$\text{01.12.27.0915.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{z^2+1}-1}}{\sqrt{2} \sqrt[4]{z^2+1}} \right) = -\frac{1}{2} \cot^{-1}(z) - \frac{\pi}{4}; (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

$$\text{01.12.27.0916.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{z^2+1}-1}}{\sqrt{2} \sqrt[4]{z^2+1}} \right) = \frac{1}{2} \cot^{-1}(z) - \frac{\pi}{4}; (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

$$\text{01.12.27.0917.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{1+z^2}-1}}{\sqrt{2} (1+z^2)^{1/4}} \right) = \frac{1}{4} \pi \sqrt{z^2} \sqrt{\frac{1}{z^2}} \sqrt{\frac{1}{z^2+1}} \sqrt{z^2+1} - \frac{\sqrt{z^2}}{2z} \cot^{-1}(z)$$

Involving  $\sin^{-1} \left( \sqrt{\sqrt{1+z^2}-1} / (\sqrt{2} (1+z^2)^{1/4}) \right)$  and  $\cot^{-1}(\frac{1}{z})$

$$\text{01.12.27.0918.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{z^2+1}-1}}{\sqrt{2} \sqrt[4]{z^2+1}} \right) = \frac{1}{2} \cot^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

$$\text{01.12.27.0919.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{z^2+1}-1}}{\sqrt{2} \sqrt[4]{z^2+1}} \right) = -\frac{1}{2} \cot^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

$$\text{01.12.27.0920.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{z^2+1}-1}}{\sqrt{2} \sqrt[4]{z^2+1}} \right) = \frac{\sqrt{z^2}}{2z} \cot^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1} \left( \sqrt{\sqrt{1+z^2}-z} / (\sqrt{2} (1+z^2)^{1/4}) \right)$



Involving  $\sin^{-1}\left(\frac{\sqrt{\sqrt{1+z^2}-z}}{\sqrt{2}(1+z^2)^{1/4}}\right)$  and  $\cot^{-1}(z)$

01.12.27.0080.02

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2+1}-z}}{\sqrt{2}\sqrt[4]{z^2+1}}\right) = \frac{1}{2}\cot^{-1}(z); \operatorname{Re}(z) > 0 \vee 0 < iz < 1 \vee iz < -1$$

01.12.27.0921.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2+1}-z}}{\sqrt{2}\sqrt[4]{z^2+1}}\right) = \frac{1}{2}\cot^{-1}(z) + \frac{\pi}{2}; \operatorname{Re}(z) < 0 \vee (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0081.02

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2+1}-z}}{\sqrt{2}\sqrt[4]{z^2+1}}\right) = \frac{1}{2}\cot^{-1}(z) - \frac{\pi}{4}\left(\frac{\sqrt{z^2}}{z} - 1\right); z \notin (-1, 1)$$

01.12.27.0922.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2+1}-z}}{\sqrt{2}\sqrt[4]{z^2+1}}\right) = \frac{\pi}{4}\left(-\sqrt{\frac{z}{z-i}}\sqrt{\frac{z-i}{z}} + \sqrt{\frac{z}{z+i}}\sqrt{\frac{z+i}{z}} - \frac{\sqrt{z^2}}{z} + 1\right) + \frac{1}{2}\sqrt{\frac{1}{1-iz}}\sqrt{1-iz}\cot^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{\sqrt{1+z^2}-z}}{\sqrt{2}(1+z^2)^{1/4}}\right)$  and  $\cot^{-1}\left(\frac{1}{z}\right)$

01.12.27.0923.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2+1}-z}}{\sqrt{2}\sqrt[4]{z^2+1}}\right) = -\frac{1}{2}\cot^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{4}; iz \notin (1, \infty)$$

01.12.27.0924.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2+1}-z}}{\sqrt{2}\sqrt[4]{z^2+1}}\right) = \frac{3\pi}{4} + \frac{1}{2}\cot^{-1}\left(\frac{1}{z}\right); (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0925.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2+1}-z}}{\sqrt{2}\sqrt{z^2+1}}\right) = -\frac{\sqrt{1-iz}}{2}\sqrt{\frac{1}{1-iz}}\cot^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{4}\left(2 - \sqrt{\frac{1}{1-iz}}\sqrt{1-iz}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\left(\sqrt{z^2+1}-1\right)/\left(2\sqrt{z^2+1}\right)}\right)$

Involving  $\sin^{-1}\left(\sqrt{\left(\sqrt{z^2+1}-1\right)/\left(2\sqrt{z^2+1}\right)}\right)$  and  $\cot^{-1}(z)$

01.12.27.0926.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-1}{2\sqrt{z^2+1}}}\right) = \frac{\pi}{4} - \frac{1}{2}\cot^{-1}(z) ; \operatorname{Re}(z) > 0 \vee (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0927.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-1}{2\sqrt{z^2+1}}}\right) = \frac{1}{2}\cot^{-1}(z) + \frac{\pi}{4} ; \operatorname{Re}(z) < 0 \vee (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0928.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-1}{2\sqrt{z^2+1}}}\right) = \frac{1}{2}\cot^{-1}(z) - \frac{\pi}{4} ; (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.0929.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-1}{2\sqrt{z^2+1}}}\right) = -\frac{1}{2}\cot^{-1}(z) - \frac{\pi}{4} ; (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0930.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-1}{2\sqrt{z^2+1}}}\right) = \frac{1}{4}\pi\sqrt{z^2}\sqrt{\frac{1}{z^2}}\sqrt{\frac{1}{z^2+1}}\sqrt{z^2+1} - \frac{\sqrt{z^2}}{2z}\cot^{-1}(z)$$

Involving  $\sin^{-1}\left(\sqrt{\left(\sqrt{z^2+1}-1\right)/\left(2\sqrt{z^2+1}\right)}\right)$  and  $\cot^{-1}\left(\frac{1}{z}\right)$

01.12.27.0931.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{1+z^2}-1}{2\sqrt{1+z^2}}}\right) = \frac{1}{2} \cot^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0932.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-1}{2\sqrt{z^2+1}}}\right) = -\frac{1}{2} \cot^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0933.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{1+z^2}-1}{2\sqrt{1+z^2}}}\right) = \frac{\sqrt{z^2}}{2z} \cot^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\left(\sqrt{z^2+1}-z\right)/\left(2\sqrt{z^2+1}\right)}\right)$

Involving  $\sin^{-1}\left(\sqrt{\left(\sqrt{z^2+1}-z\right)/\left(2\sqrt{z^2+1}\right)}\right)$  and  $\cot^{-1}(z)$

01.12.27.0082.02

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = \frac{1}{2} \cot^{-1}(z); \operatorname{Re}(z) > 0 \vee 0 < iz < 1$$

01.12.27.0934.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = \frac{1}{2} \cot^{-1}(z) + \frac{\pi}{2}; \operatorname{Re}(z) < 0 \vee (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.0935.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = \frac{\pi}{2} - \frac{1}{2} \cot^{-1}(z); (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0936.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = -\frac{1}{2} \cot^{-1}(z); (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0937.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = \frac{1}{2}\cot^{-1}(z) - \frac{1}{4}\pi\left(\frac{\sqrt{z^2}}{z} - 1\right); \operatorname{Re}(z) \neq 0$$

01.12.27.0938.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = \frac{1}{2}\sqrt{z^2+1}\sqrt{\frac{1}{z^2+1}}\cot^{-1}(z) - \frac{1}{4}\pi\left(\sqrt{\frac{1}{z^2}}z - \sqrt{\frac{1}{iz+1}}\sqrt{iz+1} + \sqrt{\frac{1}{1-iz}}\sqrt{1-iz} - 1\right)$$

Involving  $\sin^{-1}\left(\sqrt{\left(\sqrt{z^2+1}-z\right)/\left(2\sqrt{z^2+1}\right)}\right)$  and  $\cot^{-1}\left(\frac{1}{z}\right)$

01.12.27.0939.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = -\frac{1}{2}\cot^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{4}; iz \notin (-\infty, -1) \wedge iz \notin (1, \infty)$$

01.12.27.0940.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = \frac{3\pi}{4} + \frac{1}{2}\cot^{-1}\left(\frac{1}{z}\right); (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0941.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = -\frac{\pi}{4} + \frac{1}{2}\cot^{-1}\left(\frac{1}{z}\right); (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.0942.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2+1}-z}{2\sqrt{z^2+1}}}\right) = \frac{1}{4}\pi\sqrt{iz+1}\sqrt{\frac{1}{iz+1}}\left(2 - \sqrt{1-iz}\sqrt{\frac{1}{1-iz}}\right) - \frac{1}{2}\cot^{-1}\left(\frac{1}{z}\right)\sqrt{\frac{1}{z^2+1}}\sqrt{z^2+1}$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{az^c+1}}\right)$

Involving  $\sin^{-1}\left(1/\sqrt{az^c+1}\right)$  and  $\cot^{-1}\left(\sqrt{a}z^{c/2}\right)$

01.12.27.0083.01

$$\sin^{-1}\left(\frac{1}{\sqrt{az^c+1}}\right) = \frac{\sqrt{a}z^{c/2}}{\sqrt{az^c}}\cot^{-1}\left(\sqrt{a}z^{c/2}\right) - \frac{\pi i}{2}\left(\frac{\sqrt{-i\sqrt{a}\sqrt{z^c}-1}}{\sqrt{i\sqrt{a}\sqrt{z^c}+1}} + \frac{\sqrt{i\sqrt{a}\sqrt{z^c}-1}}{\sqrt{1-i\sqrt{a}\sqrt{z^c}}}\right)$$

**Involving  $\csc^{-1}$**

### Involving $\sin^{-1}(z)$

Involving  $\sin^{-1}(z)$  and  $\csc^{-1}\left(\frac{1}{z}\right)$

01.12.27.0084.01

$$\sin^{-1}(z) = \csc^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}(z)$  and  $\csc^{-1}\left(\frac{1}{1-2z^2}\right)$

01.12.27.0943.01

$$\sin^{-1}(z) = -\frac{1}{2} \csc^{-1}\left(\frac{1}{1-2z^2}\right) + \frac{\pi}{4} /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0944.01

$$\sin^{-1}(z) = \frac{1}{2} \csc^{-1}\left(\frac{1}{1-2z^2}\right) - \frac{\pi}{4} /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0945.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{2z} \left( -\csc^{-1}\left(\frac{1}{1-2z^2}\right) + \frac{\pi}{2} \right)$$

Involving  $\sin^{-1}(z)$  and  $\csc^{-1}\left(\frac{1}{2z^2-1}\right)$

01.12.27.0946.01

$$\sin^{-1}(z) = \frac{1}{2} \csc^{-1}\left(\frac{1}{2z^2-1}\right) + \frac{\pi}{4} /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0947.01

$$\sin^{-1}(z) = -\frac{1}{2} \csc^{-1}\left(\frac{1}{2z^2-1}\right) - \frac{\pi}{4} /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0948.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{2z} \left( \csc^{-1}\left(\frac{1}{2z^2-1}\right) + \frac{\pi}{2} \right)$$

Involving  $\sin^{-1}(z)$  and  $\csc^{-1}\left(\frac{\sqrt{2}}{\sqrt{1+z}}\right)$

01.12.27.0949.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + 2 \csc^{-1}\left(\frac{\sqrt{2}}{\sqrt{1+z}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\csc^{-1}\left(\sqrt{\frac{2}{1+z}}\right)$

01.12.27.0950.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + 2 \operatorname{csc}^{-1}\left(\sqrt{\frac{2}{1+z}}\right); z \notin (-\infty, -1)$$

01.12.27.0951.01

$$\sin^{-1}(z) = -2 \operatorname{csc}^{-1}\left(\sqrt{\frac{2}{1+z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0952.01

$$\sin^{-1}(z) = 2\sqrt{z+1} \sqrt{\frac{1}{z+1}} \operatorname{csc}^{-1}\left(\sqrt{\frac{2}{z+1}}\right) - \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csc}^{-1}\left(\frac{\sqrt{2}}{\sqrt{1-z}}\right)$

01.12.27.0953.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2 \operatorname{csc}^{-1}\left(\frac{\sqrt{2}}{\sqrt{1-z}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csc}^{-1}\left(\sqrt{\frac{2}{1-z}}\right)$

01.12.27.0954.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2 \operatorname{csc}^{-1}\left(\sqrt{\frac{2}{1-z}}\right); z \notin (1, \infty)$$

01.12.27.0955.01

$$\sin^{-1}(z) = 2 \operatorname{csc}^{-1}\left(\sqrt{\frac{2}{1-z}}\right) + \frac{\pi}{2}; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0956.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2\sqrt{1-z} \sqrt{\frac{1}{1-z}} \operatorname{csc}^{-1}\left(\sqrt{\frac{2}{1-z}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csc}^{-1}\left(\frac{1}{\sqrt{z^2}}\right)$

01.12.27.0957.01

$$\sin^{-1}(z) = \operatorname{csc}^{-1}\left(\frac{1}{\sqrt{z^2}}\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0958.01

$$\sin^{-1}(z) = -\operatorname{csc}^{-1}\left(\frac{1}{\sqrt{z^2}}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0959.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{z} \operatorname{csc}^{-1}\left(\frac{1}{\sqrt{z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csc}^{-1}\left(\sqrt{\frac{1}{z^2}}\right)$

01.12.27.0960.01

$$\sin^{-1}(z) = \operatorname{csc}^{-1}\left(\sqrt{\frac{1}{z^2}}\right) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0961.01

$$\sin^{-1}(z) = -\operatorname{csc}^{-1}\left(\sqrt{\frac{1}{z^2}}\right) /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0962.01

$$\sin^{-1}(z) = z \sqrt{\frac{1}{z^2}} \operatorname{csc}^{-1}\left(\sqrt{\frac{1}{z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csc}^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

01.12.27.0963.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \operatorname{csc}^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0964.01

$$\sin^{-1}(z) = \operatorname{csc}^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) - \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0965.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{z} \left( \frac{\pi}{2} - \operatorname{csc}^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) \right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csc}^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$

01.12.27.0966.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \operatorname{csc}^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) /; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0967.01

$$\sin^{-1}(z) = \csc^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) - \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) < \pi \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0968.01

$$\sin^{-1}(z) = \csc^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) + \frac{\pi}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0969.01

$$\sin^{-1}(z) = -\csc^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0970.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2} \pi}{2z} - \frac{\sqrt{1-z^2}}{z} \sqrt{\frac{z^2}{1-z^2}} \csc^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\csc^{-1}\left(\frac{1}{2z\sqrt{1-z^2}}\right)$

01.12.27.0085.01

$$\sin^{-1}(z) = \frac{1}{2} \csc^{-1}\left(\frac{1}{2z\sqrt{1-z^2}}\right) /; \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4}$$

01.12.27.0971.01

$$\sin^{-1}(z) = \frac{\pi}{4} \left( \frac{\sqrt{z^2}}{z} - \sqrt{\frac{1}{z}} \sqrt{z} \sqrt{\frac{1}{\sqrt{2}z+1}} \sqrt{\sqrt{2}z+1} + \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{\frac{1}{1-\sqrt{2}z}} \sqrt{1-\sqrt{2}z} + \frac{\sqrt{z^4-z^2}}{z\sqrt{z^2-1}} \right) - \frac{\sqrt{-z^2} \sqrt{z^2-1} \sqrt{2z^2-1}}{2\sqrt{1-2z^2} \sqrt{z^4-z^2}} \csc^{-1}\left(\frac{1}{2z\sqrt{1-z^2}}\right)$$

Involving  $\sin^{-1}(\sqrt{z})$

Involving  $\sin^{-1}(\sqrt{z})$  and  $\csc^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0972.01

$$\sin^{-1}(\sqrt{z}) = \csc^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}(\sqrt{z})$  and  $\csc^{-1}\left(\sqrt{\frac{1}{z}}\right)$



01.12.27.0973.01

$$\sin^{-1}(\sqrt{z}) = \csc^{-1}\left(\sqrt{\frac{1}{z}}\right); z \notin (-\infty, 0)$$

01.12.27.0974.01

$$\sin^{-1}(\sqrt{z}) = -\csc^{-1}\left(\sqrt{\frac{1}{z}}\right); (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0975.01

$$\sin^{-1}(\sqrt{z}) = \sqrt{z} \sqrt{\frac{1}{z}} \csc^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

### Involving $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}(\sqrt{z})$

01.12.27.0976.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \csc^{-1}(\sqrt{z})$$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(1/\sqrt{\frac{1}{z}}\right)$

01.12.27.0977.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \csc^{-1}\left(1/\sqrt{\frac{1}{z}}\right); |\arg(z)| < \pi$$

01.12.27.0978.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\csc^{-1}\left(1/\sqrt{\frac{1}{z}}\right); (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0979.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sqrt{z} \sqrt{\frac{1}{z}} \csc^{-1}\left(1/\sqrt{\frac{1}{z}}\right)$$

### Involving $\sin^{-1}\left(\sqrt{z^2}\right)$

#### Involving $\sin^{-1}\left(\sqrt{z^2}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.12.27.0102.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = \csc^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0980.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = -\operatorname{csc}^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0103.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = \frac{\sqrt{z^2}}{z} \operatorname{csc}^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}(a(bz^c)^m)$

Involving  $\sin^{-1}(a(bz^c)^m)$  and  $\operatorname{csc}^{-1}\left(\frac{1}{ab^m z^{mc}}\right)$

01.12.27.0101.01

$$\sin^{-1}(a(bz^c)^m) = \frac{(bz^c)^m}{b^m z^{mc}} \operatorname{csc}^{-1}\left(\frac{1}{ab^m z^{mc}}\right); 2m \in \mathbb{Z}$$

### Involving $\sin^{-1}(1 - 2z^2)$

Involving  $\sin^{-1}(1 - 2z^2)$  and  $\operatorname{csc}^{-1}\left(\frac{1}{z}\right)$

01.12.27.0086.01

$$\sin^{-1}(1 - 2z^2) = \frac{\pi}{2} - 2 \operatorname{csc}^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0981.01

$$\sin^{-1}(1 - 2z^2) = 2 \operatorname{csc}^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2}; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0087.01

$$\sin^{-1}(1 - 2z^2) = \frac{\pi}{2} - \frac{2\sqrt{z^2}}{z} \operatorname{csc}^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}(2z^2 - 1)$

Involving  $\sin^{-1}(2z^2 - 1)$  and  $\operatorname{csc}^{-1}\left(\frac{1}{z}\right)$

01.12.27.0982.01

$$\sin^{-1}(2z^2 - 1) = -\frac{\pi}{2} + 2 \operatorname{csc}^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0983.01

$$\sin^{-1}(2z^2 - 1) = -\frac{\pi}{2} - 2 \operatorname{csc}^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0984.01

$$\sin^{-1}(2z^2 - 1) = -\frac{\pi}{2} + \frac{2\sqrt{z^2}}{z} \csc^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(\frac{z^2-2}{z^2}\right)$

Involving  $\sin^{-1}\left(\frac{z^2-2}{z^2}\right)$  and  $\csc^{-1}(z)$

01.12.27.0985.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = \frac{\pi}{2} - 2 \csc^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0986.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = 2 \csc^{-1}(z) + \frac{\pi}{2} /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0987.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = \frac{\pi}{2} - 2z \sqrt{\frac{1}{z^2}} \csc^{-1}(z)$$

### Involving $\sin^{-1}\left(\frac{2-z^2}{z^2}\right)$

Involving  $\sin^{-1}\left(\frac{2-z^2}{z^2}\right)$  and  $\csc^{-1}(z)$

01.12.27.0988.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -\frac{\pi}{2} + 2 \csc^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.0989.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -\frac{\pi}{2} - 2 \csc^{-1}(z) /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.0990.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -\frac{\pi}{2} + 2 \sqrt{\frac{1}{z^2}} z \csc^{-1}(z)$$

### Involving $\sin^{-1}(\sqrt{1-z})$

Involving  $\sin^{-1}(\sqrt{1-z})$  and  $\csc^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0088.01

$$\sin^{-1}(\sqrt{1-z}) = \frac{\pi}{2} - \csc^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}(\sqrt{1-z})$  and  $\csc^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.0991.01

$$\sin^{-1}(\sqrt{1-z}) = \frac{\pi}{2} - \csc^{-1}\left(\sqrt{\frac{1}{z}}\right); |\arg(z)| < \pi$$

01.12.27.0992.01

$$\sin^{-1}(\sqrt{1-z}) = \frac{\pi}{2} + \csc^{-1}\left(\sqrt{\frac{1}{z}}\right); (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0993.01

$$\sin^{-1}(\sqrt{1-z}) = \frac{\pi}{2} - \sqrt{z} \sqrt{\frac{1}{z}} \csc^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1+cz}{2}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1+z}{2}}\right)$  and  $\csc^{-1}\left(\frac{1}{z}\right)$

01.12.27.0089.01

$$\sin^{-1}\left(\sqrt{\frac{1+z}{2}}\right) = \frac{1}{2} \csc^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{4}$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right)$  and  $\csc^{-1}\left(\frac{1}{z}\right)$

01.12.27.0090.01

$$\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right) = \frac{\pi}{4} - \frac{1}{2} \csc^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z-a}}{\sqrt{z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z-a}}{\sqrt{z}}\right)$  and  $\csc^{-1}\left(\sqrt{\frac{z}{a}}\right)$

01.12.27.0093.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\pi}{2} - \csc^{-1}(\sqrt{z}) \quad ; \quad |\arg(z)| < \pi$$

01.12.27.0994.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \csc^{-1}(\sqrt{z}) + \frac{\pi}{2} \quad ; \quad (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0094.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\pi}{2} - \sqrt{\frac{1}{z}} \sqrt{z} \csc^{-1}(\sqrt{z})$$

01.12.27.0095.01

$$\sin^{-1}\left(\frac{\sqrt{z-a}}{\sqrt{z}}\right) = \frac{\sqrt{z-a}}{2\sqrt{1-\frac{a}{z}}\sqrt{z}} \left( \pi - 2\sqrt{\frac{a}{z}}\sqrt{\frac{z}{a}} \csc^{-1}\left(\sqrt{\frac{z}{a}}\right) \right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

#### Involving $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$ and $\csc^{-1}(\sqrt{z})$

01.12.27.0995.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{\pi}{2} - \csc^{-1}(\sqrt{z}) \quad ; \quad z \notin (-\infty, 1)$$

01.12.27.0996.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \csc^{-1}(\sqrt{z}) + \frac{\pi}{2} \quad ; \quad (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0997.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \csc^{-1}(\sqrt{z}) - \frac{\pi}{2} \quad ; \quad (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0998.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} \left( \frac{\pi}{2} - \sqrt{\frac{1}{z}} \sqrt{z} \csc^{-1}(\sqrt{z}) \right)$$

### Involving $\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

#### Involving $\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$ and $\csc^{-1}(\sqrt{z})$

01.12.27.0091.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\pi}{2} - \csc^{-1}(\sqrt{z}) \quad /; |\arg(z)| < \pi$$

01.12.27.0999.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \csc^{-1}(\sqrt{z}) + \frac{\pi}{2} \quad /; (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0092.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\pi}{2} - \sqrt{\frac{1}{z}} \sqrt{z} \csc^{-1}(\sqrt{z})$$

### Involving $\sin^{-1}\left(\frac{\sqrt{z+a}}{\sqrt{2z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right)$  and  $\csc^{-1}(z)$

01.12.27.0100.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right) = \frac{\pi}{4} - \frac{1}{2} \csc^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right)$  and  $\csc^{-1}(z)$

01.12.27.0097.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} \left( \csc^{-1}(z) + \frac{\pi}{2} \right) \quad /; z \notin (-1, 0)$$

01.12.27.1000.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = -\frac{1}{2} \left( \csc^{-1}(z) + \frac{\pi}{2} \right) \quad /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0098.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} \sqrt{1 + \frac{1}{z}} \sqrt{\frac{z}{z+1}} \left( \csc^{-1}(z) + \frac{\pi}{2} \right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{a-z}}{\sqrt{-2z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-2z}}\right)$  and  $\csc^{-1}(z)$

01.12.27.1001.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-2z}}\right) = \frac{1}{2} \csc^{-1}(z) + \frac{\pi}{4}$$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right)$  and  $\csc^{-1}(z)$

01.12.27.1002.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = \frac{\pi}{4} - \frac{1}{2} \csc^{-1}(z) \quad ; z \notin (0, 1)$$

01.12.27.1003.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = \frac{1}{2} \csc^{-1}(z) - \frac{\pi}{4} \quad ; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1004.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} \left(\frac{\pi}{4} - \frac{1}{2} \csc^{-1}(z)\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+a}{2z}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right)$  and  $\csc^{-1}(z)$

01.12.27.0099.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right) = \frac{\pi}{4} - \frac{1}{2} \csc^{-1}(z)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right)$  and  $\csc^{-1}(z)$

01.12.27.0096.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right) = \frac{1}{2} \csc^{-1}(z) + \frac{\pi}{4}$$

Involving  $\sin^{-1}\left(\sqrt{1-z^2}\right)$

Involving  $\sin^{-1}\left(\sqrt{1-z^2}\right)$  and  $\csc^{-1}\left(\frac{1}{z}\right)$

01.12.27.0104.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \frac{\pi}{2} - \csc^{-1}\left(\frac{1}{z}\right) \quad ; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1005.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \csc^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} \quad ; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0105.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \frac{\pi}{2} - \frac{\sqrt{z^2}}{z} \operatorname{csc}^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$  and  $\operatorname{csc}^{-1}(z)$

01.12.27.1006.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi}{2} - \operatorname{csc}^{-1}(z) \quad ; \operatorname{Re}(z) > 0$$

01.12.27.1007.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -\operatorname{csc}^{-1}(z) - \frac{\pi}{2} \quad ; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.1008.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \operatorname{csc}^{-1}(z) + \frac{\pi}{2} \quad ; (i z \in \mathbb{R} \wedge i z < 0)$$

01.12.27.1009.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \operatorname{csc}^{-1}(z) - \frac{\pi}{2} \quad ; (i z \in \mathbb{R} \wedge i z > 0)$$

01.12.27.0107.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi \sqrt{z^2}}{2z} - \operatorname{csc}^{-1}(z) \quad ; \operatorname{Re}(z) \neq 0$$

01.12.27.0108.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi \sqrt{z^2}}{2z} - \sqrt{z^2} \sqrt{\frac{1}{z^2}} \operatorname{csc}^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$  and  $\operatorname{csc}^{-1}(z)$



01.12.27.1010.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi}{2} - \operatorname{csc}^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.1011.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \operatorname{csc}^{-1}(z) + \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.1012.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi}{2} - \sqrt{\frac{1}{z^2}} z \operatorname{csc}^{-1}(z)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$

#### Involving $\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$ and $\operatorname{csc}^{-1}(z)$

01.12.27.1013.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi}{2} - \operatorname{csc}^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2} \wedge z \notin (0, 1)$$

01.12.27.1014.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \operatorname{csc}^{-1}(z) + \frac{\pi}{2} /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.1015.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \operatorname{csc}^{-1}(z) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1016.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \sqrt{1-\frac{1}{z^2}} \sqrt{\frac{z^2}{z^2-1}} \left(\frac{\pi}{2} - \sqrt{\frac{1}{z^2}} z \operatorname{csc}^{-1}(z)\right)$$

### Involving $\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$

#### Involving $\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$ and $\operatorname{csc}^{-1}(z)$

01.12.27.1017.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi}{2} - \csc^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.1018.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \csc^{-1}(z) + \frac{\pi}{2} /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.1019.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi}{2} - z \sqrt{\frac{1}{z^2}} \csc^{-1}(z)$$

### Involving $\sin^{-1}\left(2z\sqrt{1-z^2}\right)$

#### Involving $\sin^{-1}\left(2z\sqrt{1-z^2}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.12.27.0106.01

$$\sin^{-1}\left(2z\sqrt{1-z^2}\right) = 2 \csc^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4}$$

01.12.27.1020.01

$$\begin{aligned} \sin^{-1}\left(2z\sqrt{1-z^2}\right) &= \frac{\pi \sqrt{1-2z^2} \sqrt{z^4-z^2}}{2\sqrt{-z^2} \sqrt{z^2-1} \sqrt{2z^2-1}} \\ &\left( \frac{\sqrt{z^2}}{z} - \sqrt{\frac{1}{z}} \sqrt{z} \sqrt{\frac{1}{\sqrt{2}z+1}} \sqrt{\sqrt{2}z+1} + \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{\frac{1}{1-\sqrt{2}z}} \sqrt{1-\sqrt{2}z} + \frac{\sqrt{z^4-z^2}}{z\sqrt{z^2-1}} \right) - \\ &\frac{2\sqrt{1-2z^2} \sqrt{z^4-z^2}}{\sqrt{-z^2} \sqrt{z^2-1} \sqrt{2z^2-1}} \csc^{-1}\left(\frac{1}{z}\right) \end{aligned}$$

### Involving $\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right)$

#### Involving $\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right)$ and $\csc^{-1}(z)$

01.12.27.1021.01

$$\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = 2 \csc^{-1}(z) /; \frac{\pi}{4} \leq |\arg(z)| < \frac{\pi}{2} \vee |z| \geq \sqrt{2} \wedge \operatorname{Re}(z) > 0$$

01.12.27.1022.01

$$\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = \frac{2\sqrt{z^2}}{z} \csc^{-1}(z) /; \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4} \vee |z| \geq \sqrt{2}$$

01.12.27.1023.01

$$\begin{aligned} \sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = & \\ & -\frac{z^3\sqrt{z^2-2}\sqrt{z^2-1}}{2\sqrt{1-z}(z+1)\sqrt{-z^4+3z^2-2}} \sqrt{\frac{1-z^2}{z^4}} \sqrt{\frac{1}{z}} \sqrt{\frac{z+1}{z}} \left( \pi \left( \frac{z^3}{1-z^2} \sqrt{\frac{1-z^2}{z^2}} \sqrt{\frac{1-z^2}{z^4}} + \sqrt{\frac{1}{z^2}} z - \right. \right. \\ & \left. \left. \sqrt{\frac{1}{z}} \sqrt{\frac{z}{z+\sqrt{2}}} \sqrt{\frac{z+\sqrt{2}}{z}} \sqrt{z} + \sqrt{1-\frac{\sqrt{2}}{z}} \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{\frac{z}{z-\sqrt{2}}} \right) - 4 \csc^{-1}(z) \right) \end{aligned}$$

Involving  $\sin^{-1}\left(\sqrt{\left(1-\sqrt{1+cz^2}\right)/2}\right)$

Involving  $\sin^{-1}\left(\sqrt{\left(1-\sqrt{1+z^2}\right)/2}\right)$  and  $\csc^{-1}\left(\frac{i}{z}\right)$

01.12.27.0109.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+z^2}}{2}}\right) = -\frac{1}{2} \csc^{-1}\left(\frac{i}{z}\right) /; -\pi < \arg(z) \leq 0$$

01.12.27.1024.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{z^2+1}\right)}\right) = \frac{1}{2} \csc^{-1}\left(\frac{i}{z}\right) /; 0 < \arg(z) \leq \pi$$

Involving  $\sin^{-1}\left(\sqrt{\left(1-\sqrt{1-z^2}\right)/2}\right)$  and  $\csc^{-1}\left(\frac{1}{z}\right)$

01.12.27.0110.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2}}\right) = \frac{1}{2} \csc^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1025.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{1-z^2}\right)}\right) = -\frac{1}{2} \csc^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0111.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2}}\right) = \frac{\sqrt{z^2}}{2z} \operatorname{csc}^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(z\sqrt{1-\sqrt{1-z^2}} / \sqrt{2z^2}\right)$

Involving  $\sin^{-1}\left(z\sqrt{1-\sqrt{1-z^2}} / \sqrt{2z^2}\right)$  and  $\operatorname{csc}^{-1}\left(\frac{1}{z}\right)$

01.12.27.0112.01

$$\sin^{-1}\left(\frac{z\sqrt{1-\sqrt{1-z^2}}}{\sqrt{2}\sqrt{z^2}}\right) = \frac{1}{2} \operatorname{csc}^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(z\sqrt{(1-\sqrt{1-z^2})(2z^2)}\right)$

Involving  $\sin^{-1}\left(z\sqrt{(1-\sqrt{1-z^2})(2z^2)}\right)$  and  $\operatorname{csc}^{-1}\left(\frac{1}{z}\right)$

01.12.27.1026.01

$$\sin^{-1}\left(z\sqrt{\frac{1-\sqrt{1-z^2}}{2z^2}}\right) = \frac{1}{2} \operatorname{csc}^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\sqrt{z-\sqrt{z^2-1}} / \sqrt{2z}\right)$

Involving  $\sin^{-1}\left(\sqrt{z-\sqrt{z^2-1}} / \sqrt{2z}\right)$  and  $\operatorname{csc}^{-1}(z)$

01.12.27.1027.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = \frac{1}{2} \csc^{-1}(z) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1028.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = \frac{1}{2} \csc^{-1}(z) + \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) < \pi \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1029.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = -\frac{1}{2} \csc^{-1}(z) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1030.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = \frac{\pi}{2} - \frac{1}{2} \csc^{-1}(z) /; (i z \in \mathbb{R} \wedge i z > 0)$$

01.12.27.1031.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = \sqrt{z} \sqrt{\frac{1}{z}} \sqrt{z+1} \sqrt{\frac{1}{z+1}} \left( \frac{1}{2} \sqrt{-iz} \sqrt{-\frac{1}{iz}} \csc^{-1}(z) - \frac{1}{4} \pi \left( \frac{\sqrt{z^2}}{z} - 1 \right) \right)$$

Involving  $\sin^{-1} \left( \sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}} \right)$

Involving  $\sin^{-1} \left( \sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}} \right)$  and  $\csc^{-1}(z)$

01.12.27.1032.01

$$\sin^{-1} \left( \sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}} \right) = \frac{1}{2} \csc^{-1}(z) /; \operatorname{Re}(z) > 0$$

01.12.27.1033.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2} \csc^{-1}(z) + \frac{\pi}{2} /; \operatorname{Re}(z) < 0$$

01.12.27.1034.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = -\frac{1}{2} \csc^{-1}(z) /; (i z \in \mathbb{R} \wedge i z < 0)$$

01.12.27.1035.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = -\frac{1}{2} \csc^{-1}(z) + \frac{\pi}{2} /; (i z \in \mathbb{R} \wedge i z > 0)$$

01.12.27.0113.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2} \csc^{-1}(z) - \frac{\pi}{4} \left(\frac{\sqrt{z^2}}{z} - 1\right) /; \operatorname{Re}(z) \neq 0$$

01.12.27.1036.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2} \sqrt{z^2} \sqrt{\frac{1}{z^2}} \csc^{-1}(z) - \frac{1}{4} \pi \left(\frac{\sqrt{z^2}}{z} - 1\right)$$

**Involving  $\sin^{-1}\left(c z^{-r} \sqrt{-1 + \frac{z^{2r}}{c^2}}\right)$**

**Involving  $\sin^{-1}\left(c z^{-r} \sqrt{-1 + \frac{z^{2r}}{c^2}}\right)$  and  $\csc^{-1}\left(\frac{z^r}{c}\right)$**

01.12.27.0114.01

$$\sin^{-1}\left(c z^{-r} \sqrt{\frac{z^{2r}}{c^2} - 1}\right) = \sqrt{c^2 z^{-2r}} \sqrt{\frac{z^{2r}}{c^2}} \left(\frac{\pi z^r \sqrt{c^2 z^{-2r}}}{2c} - \csc^{-1}\left(\frac{z^r}{c}\right)\right)$$

**Involving  $\sec^{-1}$**

**Involving  $\sin^{-1}(z)$**

**Involving  $\sin^{-1}(z)$  and  $\sec^{-1}\left(\frac{1}{z}\right)$**

01.12.27.0115.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \sec^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}(z)$  and  $\sec^{-1}\left(-\frac{1}{z}\right)$

01.12.27.1037.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + \sec^{-1}\left(-\frac{1}{z}\right)$$

Involving  $\sin^{-1}(z)$  and  $\sec^{-1}\left(\frac{1}{1-2z^2}\right)$

01.12.27.0118.01

$$\sin^{-1}(z) = \frac{1}{2} \sec^{-1}\left(\frac{1}{1-2z^2}\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1038.01

$$\sin^{-1}(z) = -\frac{1}{2} \sec^{-1}\left(\frac{1}{1-2z^2}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0119.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{2z} \sec^{-1}\left(\frac{1}{1-2z^2}\right)$$

Involving  $\sin^{-1}(z)$  and  $\sec^{-1}\left(\frac{1}{2z^2-1}\right)$

01.12.27.1039.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \frac{1}{2} \sec^{-1}\left(\frac{1}{2z^2-1}\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1040.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + \frac{1}{2} \sec^{-1}\left(\frac{1}{2z^2-1}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.1041.01

$$\sin^{-1}(z) = \frac{\pi\sqrt{z^2}}{2z} - \frac{\sqrt{z^2}}{2z} \sec^{-1}\left(\frac{1}{2z^2-1}\right)$$

Involving  $\sin^{-1}(z)$  and  $\sec^{-1}\left(\frac{\sqrt{2}}{\sqrt{1+z}}\right)$

01.12.27.1042.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2 \sec^{-1}\left(\frac{\sqrt{2}}{\sqrt{1+z}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\sec^{-1}\left(\sqrt{\frac{2}{1+z}}\right)$

01.12.27.1043.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2 \sec^{-1}\left(\sqrt{\frac{2}{1+z}}\right) /; z \notin (-\infty, -1)$$

01.12.27.1044.01

$$\sin^{-1}(z) = 2 \sec^{-1}\left(\sqrt{\frac{2}{1+z}}\right) - \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1045.01

$$\sin^{-1}(z) = \pi \left( \sqrt{z+1} \sqrt{\frac{1}{z+1} - \frac{1}{2}} - 2 \sqrt{z+1} \sqrt{\frac{1}{z+1}} \sec^{-1}\left(\sqrt{\frac{2}{z+1}}\right) \right)$$

Involving  $\sin^{-1}(z)$  and  $\sec^{-1}\left(\frac{\sqrt{2}}{\sqrt{1-z}}\right)$

01.12.27.1046.01

$$\sin^{-1}(z) = 2 \sec^{-1}\left(\frac{\sqrt{2}}{\sqrt{1-z}}\right) - \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\sec^{-1}\left(\sqrt{\frac{2}{1-z}}\right)$

01.12.27.1047.01

$$\sin^{-1}(z) = 2 \sec^{-1}\left(\sqrt{\frac{2}{1-z}}\right) - \frac{\pi}{2} /; z \notin (1, \infty)$$

01.12.27.1048.01

$$\sin^{-1}(z) = \frac{3\pi}{2} - 2 \sec^{-1}\left(\sqrt{\frac{2}{1-z}}\right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1049.01

$$\sin^{-1}(z) = 2 \sqrt{1-z} \sqrt{\frac{1}{1-z}} \sec^{-1}\left(\sqrt{\frac{2}{1-z}}\right) - \left( \sqrt{1-z} \sqrt{\frac{1}{1-z} - \frac{1}{2}} \right) \pi$$

Involving  $\sin^{-1}(z)$  and  $\sec^{-1}\left(\frac{1}{\sqrt{z^2}}\right)$

01.12.27.1050.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \sec^{-1}\left(\frac{1}{\sqrt{z^2}}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$



01.12.27.1051.01

$$\sin^{-1}(z) = \sec^{-1}\left(\frac{1}{\sqrt{z^2}}\right) - \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.1052.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{z} \left( \frac{\pi}{2} - \sec^{-1}\left(\frac{1}{\sqrt{z^2}}\right) \right)$$

Involving  $\sin^{-1}(z)$  and  $\sec^{-1}\left(\sqrt{\frac{1}{z^2}}\right)$

01.12.27.1053.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \sec^{-1}\left(\sqrt{\frac{1}{z^2}}\right) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.1054.01

$$\sin^{-1}(z) = \sec^{-1}\left(\sqrt{\frac{1}{z^2}}\right) - \frac{\pi}{2} /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.1055.01

$$\sin^{-1}(z) = z \sqrt{\frac{1}{z^2}} \left( \frac{\pi}{2} - \sec^{-1}\left(\sqrt{\frac{1}{z^2}}\right) \right)$$

Involving  $\sin^{-1}(z)$  and  $\sec^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

01.12.27.0116.01

$$\sin^{-1}(z) = \sec^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1056.01

$$\sin^{-1}(z) = -\sec^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0117.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{z} \sec^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\sec^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$

01.12.27.1057.01

$$\sin^{-1}(z) = \sec^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right); 0 < \arg(z) \leq \frac{\pi}{2} \vee -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1058.01

$$\sin^{-1}(z) = -\sec^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right); \frac{\pi}{2} < \arg(z) < \pi \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1059.01

$$\sin^{-1}(z) = \pi - \sec^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right); (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1060.01

$$\sin^{-1}(z) = -\pi + \sec^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right); (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1061.01

$$\sin^{-1}(z) = \frac{1}{2} \left( -\sqrt{\frac{1}{1-z}} \sqrt{1-z} + \sqrt{z+1} \sqrt{\frac{1}{z+1}} \right) \pi + \frac{\sqrt{1-z^2}}{z} \sqrt{\frac{z^2}{1-z^2}} \sec^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\sec^{-1}\left(\frac{1}{2z\sqrt{1-z^2}}\right)$

01.12.27.0120.01

$$\sin^{-1}(z) = \frac{\pi}{4} - \frac{1}{2} \sec^{-1}\left(\frac{1}{2z\sqrt{1-z^2}}\right); \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4}$$

01.12.27.1062.01

$$\sin^{-1}(z) = \frac{\pi}{4} \left( \frac{\sqrt{z^2}}{z} - \sqrt{\frac{1}{z}} \sqrt{z} \sqrt{\frac{1}{\sqrt{2}z+1}} \sqrt{\sqrt{2}z+1} + \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{\frac{1}{1-\sqrt{2}z}} \sqrt{1-\sqrt{2}z} + \frac{\sqrt{z^4-z^2}}{z\sqrt{z^2-1}} \right) - \frac{\sqrt{-z^2} \sqrt{z^2-1} \sqrt{2z^2-1}}{2\sqrt{1-2z^2} \sqrt{z^4-z^2}} \left( \frac{\pi}{2} - \sec^{-1}\left(\frac{1}{2z\sqrt{1-z^2}}\right) \right)$$

Involving  $\sin^{-1}(\sqrt{z})$

Involving  $\sin^{-1}(\sqrt{z})$  and  $\sec^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1063.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} - \sec^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}(\sqrt{z})$  and  $\sec^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1064.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} - \sec^{-1}\left(\sqrt{\frac{1}{z}}\right); z \notin (-\infty, 0)$$

01.12.27.1065.01

$$\sin^{-1}(\sqrt{z}) = \sec^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1066.01

$$\sin^{-1}(\sqrt{z}) = \sqrt{z} \sqrt{\frac{1}{z}} \left( \frac{\pi}{2} - \sec^{-1}\left(\sqrt{\frac{1}{z}}\right) \right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$  and  $\sec^{-1}(\sqrt{z})$

01.12.27.1067.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi}{2} - \sec^{-1}(\sqrt{z})$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$  and  $\sec^{-1}\left(1/\sqrt{\frac{1}{z}}\right)$

01.12.27.1068.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi}{2} - \sec^{-1}\left(1/\sqrt{\frac{1}{z}}\right); |\arg(z)| < \pi$$

01.12.27.1069.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sec^{-1}\left(1/\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1070.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sqrt{z} \sqrt{\frac{1}{z}} \left( \frac{\pi}{2} - \sec^{-1}\left(1/\sqrt{\frac{1}{z}}\right) \right)$$

Involving  $\sin^{-1}(\sqrt{z^2})$

Involving  $\sin^{-1}\left(\sqrt{z^2}\right)$  and  $\sec^{-1}\left(\frac{1}{z}\right)$

01.12.27.0136.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = \frac{\pi}{2} - \sec^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1071.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = \sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0137.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = \frac{\sqrt{z^2}}{z} \left( \frac{\pi}{2} - \sec^{-1}\left(\frac{1}{z}\right) \right)$$

Involving  $\sin^{-1}\left(a(bz^c)^m\right)$

Involving  $\sin^{-1}\left(a(bz^c)^m\right)$  and  $\sec^{-1}\left(\frac{1}{ab^m z^{mc}}\right)$

01.12.27.0135.01

$$\sin^{-1}\left(a(bz^c)^m\right) = \frac{(bz^c)^m}{b^m z^{mc}} \left( \frac{\pi}{2} - \sec^{-1}\left(\frac{1}{ab^m z^{mc}}\right) \right); 2m \in \mathbb{Z}$$

Involving  $\sin^{-1}(1 - 2z^2)$

Involving  $\sin^{-1}(1 - 2z^2)$  and  $\sec^{-1}\left(\frac{1}{z}\right)$

01.12.27.0121.01

$$\sin^{-1}(1 - 2z^2) = 2 \sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1072.01

$$\sin^{-1}(1 - 2z^2) = \frac{3\pi}{2} - 2 \sec^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0122.01

$$\sin^{-1}(1 - 2z^2) = \pi \left( \frac{1}{2} - \frac{\sqrt{z^2}}{z} \right) + \frac{2\sqrt{z^2}}{z} \sec^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}(2z^2 - 1)$

Involving  $\sin^{-1}(2z^2 - 1)$  and  $\sec^{-1}\left(\frac{1}{z}\right)$

01.12.27.1073.01

$$\sin^{-1}(2z^2 - 1) = -2 \sec^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2}; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1074.01

$$\sin^{-1}(2z^2 - 1) = -\frac{3\pi}{2} + 2 \sec^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.1075.01

$$\sin^{-1}(2z^2 - 1) = -\pi \left( \frac{1}{2} - \frac{\sqrt{z^2}}{z} \right) - \frac{2\sqrt{z^2}}{z} \sec^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(\frac{z^2-2}{z^2}\right)$

#### Involving $\sin^{-1}\left(\frac{z^2-2}{z^2}\right)$ and $\sec^{-1}(z)$

01.12.27.1076.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = 2 \sec^{-1}(z) - \frac{\pi}{2}; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.1077.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = \frac{3\pi}{2} - 2 \sec^{-1}(z); \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.1078.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = \frac{1}{2}\pi \left( 1 - 2z \sqrt{\frac{1}{z^2}} \right) + 2z \sqrt{\frac{1}{z^2}} \sec^{-1}(z)$$

### Involving $\sin^{-1}\left(\frac{2-z^2}{z^2}\right)$

#### Involving $\sin^{-1}\left(\frac{2-z^2}{z^2}\right)$ and $\sec^{-1}(z)$

01.12.27.1079.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = \frac{\pi}{2} - 2 \sec^{-1}(z); -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.1080.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -\frac{3\pi}{2} + 2 \sec^{-1}(z); \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.1081.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -\frac{\pi}{2} \left( 1 - 2z \sqrt{\frac{1}{z^2}} \right) - 2z \sqrt{\frac{1}{z^2}} \sec^{-1}(z)$$

### Involving $\sin^{-1}(\sqrt{1-z})$

Involving  $\sin^{-1}(\sqrt{1-z})$  and  $\sec^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0123.01

$$\sin^{-1}(\sqrt{1-z}) = \sec^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}(\sqrt{1-z})$  and  $\sec^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1082.01

$$\sin^{-1}(\sqrt{1-z}) = \sec^{-1}\left(\sqrt{\frac{1}{z}}\right); |\arg(z)| < \pi$$

01.12.27.1083.01

$$\sin^{-1}(\sqrt{1-z}) = \pi - \sec^{-1}\left(\sqrt{\frac{1}{z}}\right); (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1084.01

$$\sin^{-1}(\sqrt{1-z}) = \frac{1}{2}\pi \left(1 - \sqrt{z}\sqrt{\frac{1}{z}}\right) + \sqrt{\frac{1}{z}}\sqrt{z}\sec^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

### Involving $\sin^{-1}\left(\sqrt{\frac{1+cz}{2}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1+z}{2}}\right)$  and  $\sec^{-1}\left(\frac{1}{z}\right)$

01.12.27.0124.01

$$\sin^{-1}\left(\sqrt{\frac{1+z}{2}}\right) = \frac{1}{2}\left(\pi - \sec^{-1}\left(\frac{1}{z}\right)\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right)$  and  $\sec^{-1}\left(\frac{1}{z}\right)$

01.12.27.0125.01

$$\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right) = \frac{1}{2}\sec^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$  and  $\sec^{-1}(\sqrt{z})$

01.12.27.0128.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \sec^{-1}(\sqrt{z}) /; |\arg(z)| < \pi$$

01.12.27.1085.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \pi - \sec^{-1}(\sqrt{z}) /; (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0129.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\pi}{2} \left(1 - \sqrt{z} \sqrt{\frac{1}{z}}\right) + \sqrt{\frac{1}{z}} \sqrt{z} \sec^{-1}(\sqrt{z})$$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$  and  $\sec^{-1}(\sqrt{z})$

01.12.27.1086.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \sec^{-1}(\sqrt{z}) /; z \notin (-\infty, 1)$$

01.12.27.1087.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -\sec^{-1}(\sqrt{z}) /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1088.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \pi - \sec^{-1}(\sqrt{z}) /; (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1089.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} \left(\frac{1}{2} \pi \left(1 - \sqrt{\frac{1}{z}} \sqrt{z}\right) + \sqrt{\frac{1}{z}} \sqrt{z} \sec^{-1}(\sqrt{z})\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$  and  $\sec^{-1}(\sqrt{z})$

01.12.27.0126.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \sec^{-1}(\sqrt{z}) \text{ ; } |\arg(z)| < \pi$$

01.12.27.1090.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \pi - \sec^{-1}(\sqrt{z}) \text{ ; } (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0127.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\pi}{2} \left(1 - \sqrt{z}\right) \sqrt{\frac{1}{z}} + \sqrt{\frac{1}{z}} \sqrt{z} \sec^{-1}(\sqrt{z})$$

### Involving $\sin^{-1}\left(\frac{\sqrt{z+a}}{\sqrt{2z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right)$  and  $\sec^{-1}(z)$

01.12.27.0134.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right) = \frac{1}{2} \sec^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right)$  and  $\sec^{-1}(z)$

01.12.27.0131.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} (\pi - \sec^{-1}(z)) \text{ ; } z \notin (-1, 0)$$

01.12.27.1091.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} \sec^{-1}(z) - \frac{\pi}{2} \text{ ; } (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0132.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} \sqrt{1 + \frac{1}{z}} \sqrt{\frac{z}{z+1}} (\pi - \sec^{-1}(z))$$

### Involving $\sin^{-1}\left(\frac{\sqrt{a-z}}{\sqrt{-2z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right)$  and  $\sec^{-1}(z)$

01.12.27.1092.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = \frac{1}{2} \sec^{-1}(z) \text{ ; } z \notin (0, 1)$$



01.12.27.1093.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = -\frac{1}{2} \sec^{-1}(z); (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1094.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = \frac{1}{2} \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} \sec^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-2z}}\right)$  and  $\sec^{-1}(z)$

01.12.27.1095.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-2z}}\right) = \frac{1}{2} (\pi - \sec^{-1}(z))$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+a}{2z}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right)$  and  $\sec^{-1}(z)$

01.12.27.0133.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right) = \frac{1}{2} \sec^{-1}(z)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right)$  and  $\sec^{-1}(z)$

01.12.27.0130.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right) = \frac{1}{2} (\pi - \sec^{-1}(z))$$

Involving  $\sin^{-1}\left(\sqrt{1-z^2}\right)$

Involving  $\sin^{-1}\left(\sqrt{1-z^2}\right)$  and  $\sec^{-1}\left(\frac{1}{z}\right)$

01.12.27.0138.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \sec^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1096.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \pi - \sec^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0139.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \frac{\sqrt{z^2}}{z} \sec^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} \left(1 - \frac{\sqrt{z^2}}{z}\right)$$

**Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$**

**Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$  and  $\sec^{-1}(z)$**

01.12.27.1097.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \sec^{-1}(z) \quad ; \quad \operatorname{Re}(z) > 0$$

01.12.27.1098.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \sec^{-1}(z) - \pi \quad ; \quad \operatorname{Re}(z) < 0$$

01.12.27.1099.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \pi - \sec^{-1}(z) \quad ; \quad (i z \in \mathbb{R} \wedge i z < 0)$$

01.12.27.1100.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -\sec^{-1}(z) \quad ; \quad (i z \in \mathbb{R} \wedge i z > 0)$$

01.12.27.0141.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi}{2} \left(\frac{\sqrt{z^2}}{z} - 1\right) + \sec^{-1}(z) \quad ; \quad \operatorname{Re}(z) \neq 0$$

01.12.27.0142.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\sqrt{z^2}}{2z} \left(2 \sqrt{\frac{1}{z^2}} \sec^{-1}(z) z - \pi \sqrt{\frac{1}{z^2}} z + \pi\right)$$

**Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$**

**Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$  and  $\sec^{-1}(z)$**

01.12.27.1101.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \sec^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.1102.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \pi - \sec^{-1}(z) /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.1103.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi}{2} \left(1 - \sqrt{\frac{1}{z^2}} z\right) + z \sqrt{\frac{1}{z^2}} \sec^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$  and  $\sec^{-1}(z)$

01.12.27.1104.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \sec^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) < 0 \vee 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1105.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \pi - \sec^{-1}(z) /; \frac{\pi}{2} \leq \arg(z) < \pi \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1106.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -\sec^{-1}(z) /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1107.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \sec^{-1}(z) - \pi /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1108.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \sqrt{1-\frac{1}{z^2}} \sqrt{\frac{z^2}{z^2-1}} \left(\frac{1}{2}\pi \left(1 - \sqrt{\frac{1}{z^2}} z\right) + z \sqrt{\frac{1}{z^2}} \sec^{-1}(z)\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$  and  $\sec^{-1}(z)$

01.12.27.1109.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \sec^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.1110.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \pi - \sec^{-1}(z) /; \frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.1111.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi}{2} \left(1 - \sqrt{\frac{1}{z^2}} z\right) + z \sqrt{\frac{1}{z^2}} \sec^{-1}(z)$$

Involving  $\sin^{-1}\left(2z\sqrt{1-z^2}\right)$

Involving  $\sin^{-1}\left(2z\sqrt{1-z^2}\right)$  and  $\sec^{-1}\left(\frac{1}{z}\right)$

01.12.27.0140.01

$$\sin^{-1}\left(2z\sqrt{1-z^2}\right) = \pi - 2 \sec^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4}$$

01.12.27.1112.01

$$\begin{aligned} \sin^{-1}\left(2z\sqrt{1-z^2}\right) &= \frac{\pi \sqrt{1-2z^2} \sqrt{z^4-z^2}}{2\sqrt{-z^2} \sqrt{z^2-1} \sqrt{2z^2-1}} \\ &\left( \frac{\sqrt{z^2}}{z} - \sqrt{\frac{1}{z}} \sqrt{z} \sqrt{\frac{1}{\sqrt{2}z+1}} \sqrt{\sqrt{2}z+1} + \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{\frac{1}{1-\sqrt{2}z}} \sqrt{1-\sqrt{2}z} + \frac{\sqrt{z^4-z^2}}{z\sqrt{z^2-1}} - 2 \right) + \\ &\frac{2\sqrt{1-2z^2} \sqrt{z^4-z^2}}{\sqrt{-z^2} \sqrt{z^2-1} \sqrt{2z^2-1}} \sec^{-1}\left(\frac{1}{z}\right) \end{aligned}$$

Involving  $\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right)$

Involving  $\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right)$  and  $\sec^{-1}(z)$

01.12.27.1113.01

$$\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = \pi - 2 \sec^{-1}(z) ; \frac{\pi}{4} \leq |\arg(z)| < \frac{\pi}{2} \vee |z| \geq \sqrt{2} \wedge \operatorname{Re}(z) > 0$$

01.12.27.1114.01

$$\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = \frac{\sqrt{z^2}}{z} (\pi - 2 \sec^{-1}(z)) ; \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4} \vee |z| \geq \sqrt{2}$$

01.12.27.1115.01

$$\begin{aligned} \sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = & -\frac{z^3 \sqrt{z^2-2} \sqrt{z^2-1}}{2\sqrt{1-z} (z+1) \sqrt{-z^4+3z^2-2}} \sqrt{\frac{1-z^2}{z^4}} \sqrt{\frac{1}{z}} \sqrt{\frac{-z+1}{z}} \left( \pi \left( \frac{z^3}{1-z^2} \sqrt{\frac{1-z^2}{z^2}} \sqrt{\frac{1-z^2}{z^4}} + \sqrt{\frac{1}{z^2}} z - \right. \right. \\ & \left. \left. \sqrt{\frac{1}{z}} \sqrt{\frac{z}{z+\sqrt{2}}} \sqrt{\frac{z+\sqrt{2}}{z}} \sqrt{z} + \sqrt{1-\frac{\sqrt{2}}{z}} \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{\frac{z}{z-\sqrt{2}}} - 2 \right) + 4 \sec^{-1}(z) \right) \end{aligned}$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+cz^2}}{2}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+z^2}}{2}}\right)$  and  $\sec^{-1}\left(-\frac{i}{z}\right)$

01.12.27.0143.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+z^2}}{2}}\right) = \frac{1}{2} \left( \frac{\pi}{2} - \sec^{-1}\left(-\frac{i}{z}\right) \right) ; -\pi < \arg(z) \leq 0$$

01.12.27.1116.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}(1-\sqrt{z^2+1})}\right) = \frac{1}{2} \sec^{-1}\left(-\frac{i}{z}\right) - \frac{\pi}{4} ; 0 < \arg(z) \leq \pi$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2}}\right)$  and  $\sec^{-1}\left(\frac{1}{z}\right)$

01.12.27.0144.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2}}\right) = \frac{1}{2}\left(\frac{\pi}{2} - \sec^{-1}\left(\frac{1}{z}\right)\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1117.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}(1-\sqrt{1-z^2})}\right) = \frac{1}{2}\left(\sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0145.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2}}\right) = \frac{\sqrt{z^2}}{2z}\left(\frac{\pi}{2} - \sec^{-1}\left(\frac{1}{z}\right)\right)$$

Involving  $\sin^{-1}\left(z\sqrt{1-\sqrt{1-z^2}}/\sqrt{2z^2}\right)$

Involving  $\sin^{-1}\left(z\sqrt{1-\sqrt{1-z^2}}/\sqrt{2z^2}\right)$  and  $\sec^{-1}\left(\frac{1}{z}\right)$

01.12.27.0146.01

$$\sin^{-1}\left(\frac{z\sqrt{1-\sqrt{1-z^2}}}{\sqrt{2}\sqrt{z^2}}\right) = \frac{1}{2}\left(\frac{\pi}{2} - \sec^{-1}\left(\frac{1}{z}\right)\right)$$

Involving  $\sin^{-1}\left(z\sqrt{(1-\sqrt{1-z^2})}/(2z^2)\right)$

Involving  $\sin^{-1}\left(z\sqrt{(1-\sqrt{1-z^2})}/(2z^2)\right)$  and  $\sec^{-1}\left(\frac{1}{z}\right)$

01.12.27.1118.01

$$\sin^{-1}\left(z\sqrt{\frac{1-\sqrt{1-z^2}}{2z^2}}\right) = \frac{1}{2}\left(\frac{\pi}{2} - \sec^{-1}\left(\frac{1}{z}\right)\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right)$  and  $\sec^{-1}(z)$

01.12.27.1119.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = \frac{1}{2}\left(\frac{\pi}{2} - \sec^{-1}(z)\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1120.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = \frac{3\pi}{4} - \frac{1}{2}\sec^{-1}(z); \frac{\pi}{2} < \arg(z) < \pi \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1121.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = \frac{1}{2}\sec^{-1}(z) - \frac{3\pi}{4}; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1122.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = \frac{1}{2}\sec^{-1}(z) + \frac{\pi}{4}; (iz \in \mathbb{R} \wedge iz > 0)$$

01.12.27.1123.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = \sqrt{z} \sqrt{\frac{1}{z}} \sqrt{z+1} \sqrt{\frac{1}{z+1}} \left( \frac{1}{2} \sqrt{-iz} \sqrt{-\frac{1}{iz}} \left( \frac{\pi}{2} - \sec^{-1}(z) \right) - \frac{1}{4} \pi \left( \frac{\sqrt{z^2}}{z} - 1 \right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{(z - \sqrt{z^2 - 1})}}{(2z)}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right)$  and  $\sec^{-1}(z)$

01.12.27.1124.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2}\left(\frac{\pi}{2} - \sec^{-1}(z)\right); \operatorname{Re}(z) > 0$$

01.12.27.1125.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{3\pi}{4} - \frac{1}{2}\sec^{-1}(z); \operatorname{Re}(z) < 0$$

01.12.27.1126.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2}\sec^{-1}(z) - \frac{\pi}{4}; (iz \in \mathbb{R} \wedge iz < 0)$$

01.12.27.1127.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2}\sec^{-1}(z) + \frac{\pi}{4}; (iz \in \mathbb{R} \wedge iz > 0)$$

01.12.27.1128.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{\pi}{4}\left(2 - \frac{\sqrt{z^2}}{z}\right) - \frac{1}{2}\sec^{-1}(z); \operatorname{Re}(z) \neq 0$$

01.12.27.1129.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2}\sqrt{z^2} \sqrt{\frac{1}{z^2}} \left(\frac{\pi}{2} - \sec^{-1}(z)\right) - \frac{1}{4}\pi \left(\frac{\sqrt{z^2}}{z} - 1\right)$$

Involving  $\sin^{-1}\left(c z^{-r} \sqrt{-1 + \frac{z^{2r}}{c^2}}\right)$

Involving  $\sin^{-1}\left(c z^{-r} \sqrt{-1 + \frac{z^{2r}}{c^2}}\right)$  and  $\sec^{-1}\left(\frac{z^r}{c}\right)$

01.12.27.1130.01

$$\sin^{-1}\left(c z^{-r} \sqrt{\frac{z^{2r}}{c^2} - 1}\right) = \sqrt{c^2 z^{-2r}} \sqrt{\frac{z^{2r}}{c^2}} \left(\frac{\pi z^r \sqrt{c^2 z^{-2r}}}{2c} + \sec^{-1}\left(\frac{z^r}{c}\right) - \frac{\pi}{2}\right)$$



### Involving $\sinh^{-1}$

#### Involving $\sin^{-1}(z)$

Involving  $\sin^{-1}(z)$  and  $\sinh^{-1}(iz)$

01.12.27.0147.01

$$\sin^{-1}(z) = -i \sinh^{-1}(iz)$$

Involving  $\sin^{-1}(z)$  and  $\sinh^{-1}(i(2z^2 - 1))$

01.12.27.1131.01

$$\sin^{-1}(z) = \frac{1}{2} \left( \frac{\pi}{2} - i \sinh^{-1}(i(2z^2 - 1)) \right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1132.01

$$\sin^{-1}(z) = \frac{1}{2} \left( i \sinh^{-1}(i(2z^2 - 1)) - \frac{\pi}{2} \right) /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.1133.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{2z} \left( \frac{\pi}{2} - i \sinh^{-1}(i(2z^2 - 1)) \right)$$

Involving  $\sin^{-1}(z)$  and  $\sinh^{-1}\left(\sqrt{\frac{z-1}{2}}\right)$

01.12.27.1134.01

$$\sin^{-1}(z) = 2i \sinh^{-1}\left(\sqrt{\frac{z-1}{2}}\right) + \frac{\pi}{2} /; 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1135.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2i \sinh^{-1}\left(\sqrt{\frac{z-1}{2}}\right) /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1136.01

$$\sin^{-1}(z) = \frac{2\sqrt{z-1}}{\sqrt{1-z}} \sinh^{-1}\left(\sqrt{\frac{z-1}{2}}\right) + \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\sinh^{-1}\left(\sqrt{\frac{-z-1}{2}}\right)$

01.12.27.1137.01

$$\sin^{-1}(z) = 2i \sinh^{-1}\left(\sqrt{\frac{-z-1}{2}}\right) - \frac{\pi}{2} /; 0 < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1138.01

$$\sin^{-1}(z) = -\frac{\pi}{2} - 2i \sinh^{-1}\left(\sqrt{\frac{-z-1}{2}}\right); -\pi < \arg(z) \leq 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1139.01

$$\sin^{-1}(z) = -\frac{2\sqrt{-z-1}}{\sqrt{z+1}} \sinh^{-1}\left(\sqrt{\frac{1}{2}(-z-1)}\right) - \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\sinh^{-1}\left(\sqrt{-z^2}\right)$

01.12.27.1140.01

$$\sin^{-1}(z) = i \sinh^{-1}\left(\sqrt{-z^2}\right); 0 < \arg(z) \leq \pi$$

01.12.27.1141.01

$$\sin^{-1}(z) = -i \sinh^{-1}\left(\sqrt{-z^2}\right); -\pi < \arg(z) \leq 0$$

01.12.27.1142.01

$$\sin^{-1}(z) = -\frac{\sqrt{-z^2}}{z} \sinh^{-1}\left(\sqrt{-z^2}\right)$$

Involving  $\sin^{-1}(z)$  and  $\sinh^{-1}\left(\sqrt{z^2-1}\right)$

01.12.27.1143.01

$$\sin^{-1}(z) = i \sinh^{-1}\left(\sqrt{z^2-1}\right) + \frac{\pi}{2}; 0 < \arg(z) \leq \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1144.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \sinh^{-1}\left(\sqrt{z^2-1}\right); -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1145.01

$$\sin^{-1}(z) = i \sinh^{-1}\left(\sqrt{z^2-1}\right) - \frac{\pi}{2}; \frac{\pi}{2} < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1146.01

$$\sin^{-1}(z) = -i \sinh^{-1}\left(\sqrt{z^2-1}\right) - \frac{\pi}{2}; -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1147.01

$$\sin^{-1}(z) = \frac{\pi\sqrt{z^2}}{2z} - \frac{\sqrt{-z^2}}{z} \sqrt{\frac{z-1}{z+1}} \sqrt{\frac{z+1}{z-1}} \sinh^{-1}\left(\sqrt{z^2-1}\right)$$

Involving  $\sin^{-1}(z)$  and  $\sinh^{-1}\left(2z\sqrt{z^2-1}\right)$

01.12.27.0149.01

$$\sin^{-1}(z) = \frac{\sqrt{-z^4}}{2z^2} \sinh^{-1}\left(2z\sqrt{z^2-1}\right); \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4}$$

01.12.27.1148.01

$$\sin^{-1}(z) = \frac{1}{4}\pi \left( \frac{\sqrt{z^2}}{z} - \sqrt{\frac{1}{z}} \sqrt{z} \sqrt{\frac{1}{\sqrt{2}z+1}} \sqrt{\sqrt{2}z+1} + \sqrt{\frac{1}{z}} \sqrt{-z} \sqrt{\frac{1}{1-\sqrt{2}z}} \sqrt{1-\sqrt{2}z} + \frac{\sqrt{z^4-z^2}}{z\sqrt{z^2-1}} \right) + \frac{\sqrt{z^2(z^2-1)} \sqrt{2z^2-1}}{2z^2\sqrt{1-2z^2}} \sqrt{\frac{z^2}{z^2-1}} \sinh^{-1}\left(2z\sqrt{z^2-1}\right)$$

### Involving $\sin^{-1}(iz)$

Involving  $\sin^{-1}(iz)$  and  $\sinh^{-1}(z)$

01.12.27.0148.01

$$\sin^{-1}(iz) = i \sinh^{-1}(z)$$

### Involving $\sin^{-1}(\sqrt{cz})$

Involving  $\sin^{-1}(\sqrt{z})$  and  $\sinh^{-1}(\sqrt{-z})$

01.12.27.1149.01

$$\sin^{-1}(\sqrt{z}) = i \sinh^{-1}(\sqrt{-z}); 0 < \arg(z) \leq \pi$$

01.12.27.1150.01

$$\sin^{-1}(\sqrt{z}) = -i \sinh^{-1}(\sqrt{-z}); -\pi < \arg(z) \leq 0$$

01.12.27.1151.01

$$\sin^{-1}(\sqrt{z}) = -\frac{\sqrt{-z^2}}{z} \sinh^{-1}(\sqrt{-z})$$

Involving  $\sin^{-1}(\sqrt{-z})$  and  $\sinh^{-1}(\sqrt{z})$

01.12.27.1152.01

$$\sin^{-1}(\sqrt{-z}) = -i \sinh^{-1}(\sqrt{z}); 0 < \arg(z) \leq \pi$$

01.12.27.0152.01

$$\sin^{-1}(\sqrt{-z}) = i \sinh^{-1}(\sqrt{z}); -\pi < \arg(z) \leq 0$$

01.12.27.0153.01

$$\sin^{-1}(\sqrt{-z}) = \frac{\sqrt{-z^2}}{z} \sinh^{-1}(\sqrt{z})$$

### Involving $\sin^{-1}\left(\frac{1}{\sqrt{cz}}\right)$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\frac{1}{\sqrt{-z}}\right)$

01.12.27.1153.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i \sinh^{-1}\left(\frac{1}{\sqrt{-z}}\right); 0 < \arg(z) \leq \pi$$

01.12.27.1154.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = i \sinh^{-1}\left(\frac{1}{\sqrt{-z}}\right); -\pi < \arg(z) \leq 0$$

01.12.27.1155.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{z} \sinh^{-1}\left(\frac{1}{\sqrt{-z}}\right)$$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\sqrt{-\frac{1}{z}}\right)$

01.12.27.1156.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i \sinh^{-1}\left(\sqrt{-\frac{1}{z}}\right); \operatorname{Im}(z) \geq 0$$

01.12.27.1157.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = i \sinh^{-1}\left(\sqrt{-\frac{1}{z}}\right); \operatorname{Im}(z) < 0$$

01.12.27.1158.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\sqrt{-\frac{1}{z}} \sqrt{z} \sinh^{-1}\left(\sqrt{-\frac{1}{z}}\right)$$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right)$ and $\sinh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1159.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = i \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right); 0 < \arg(z) \leq \pi$$

01.12.27.1160.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -i \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right); -\pi < \arg(z) \leq 0$$

01.12.27.1161.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -\frac{\sqrt{-z^2}}{z} \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right)$  and  $\sinh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1162.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = i \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) > 0$$

01.12.27.1163.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -i \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) \leq 0$$

01.12.27.1164.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -\sqrt{\frac{1}{z}} \sqrt{-z} \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\sqrt{cz^2}\right)$

Involving  $\sin^{-1}\left(\sqrt{z^2}\right)$  and  $\sinh^{-1}(iz)$

01.12.27.1165.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = -i \sinh^{-1}(iz); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1166.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = i \sinh^{-1}(iz); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.1167.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = -\frac{i\sqrt{z^2}}{z} \sinh^{-1}(iz)$$

Involving  $\sin^{-1}\left(\sqrt{-z^2}\right)$  and  $\sinh^{-1}(z)$

01.12.27.0160.01

$$\sin^{-1}\left(\sqrt{-z^2}\right) = i \sinh^{-1}(z); -\pi < \arg(z) \leq 0$$

01.12.27.1168.01

$$\sin^{-1}\left(\sqrt{-z^2}\right) = -i \sinh^{-1}(z); 0 < \arg(z) \leq \pi$$

01.12.27.0161.01

$$\sin^{-1}\left(\sqrt{-z^2}\right) = \frac{\sqrt{-z^2}}{z} \sinh^{-1}(z)$$

### Involving $\sin^{-1}(a(bz^c)^m)$

Involving  $\sin^{-1}(a(bz^c)^m)$  and  $\sinh^{-1}(iab^m z^{mc})$

01.12.27.1169.01

$$\sin^{-1}(a(bz^c)^m) = -\frac{i(bz^c)^m}{b^m z^{mc}} \sinh^{-1}(iab^m z^{mc}) ; 2m \in \mathbb{Z}$$

### Involving $\sin^{-1}(1+2z^2)$

Involving  $\sin^{-1}(1+2z^2)$  and  $\sinh^{-1}(z)$

01.12.27.0150.02

$$\sin^{-1}(1+2z^2) = \frac{\pi}{2} - 2i \sinh^{-1}(z) ; -\pi < \arg(z) \leq 0$$

01.12.27.1170.01

$$\sin^{-1}(2z^2+1) = 2i \sinh^{-1}(z) + \frac{\pi}{2} ; 0 < \arg(z) \leq \pi$$

01.12.27.0151.01

$$\sin^{-1}(2z^2+1) = \frac{\pi}{2} - \frac{2\sqrt{-z^2}}{z} \sinh^{-1}(z)$$

### Involving $\sin^{-1}\left(\frac{z^2+2}{z^2}\right)$

Involving  $\sin^{-1}\left(\frac{z^2+2}{z^2}\right)$  and  $\sinh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1171.01

$$\sin^{-1}\left(\frac{z^2+2}{z^2}\right) = \frac{\pi}{2} - 2i \sinh^{-1}\left(\frac{1}{z}\right) ; 0 \leq \arg(z) < \pi$$

01.12.27.1172.01

$$\sin^{-1}\left(\frac{z^2+2}{z^2}\right) = 2i \sinh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} ; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1173.01

$$\sin^{-1}\left(\frac{z^2+2}{z^2}\right) = \frac{\pi}{2} - 2z \sqrt{-\frac{1}{z^2}} \sinh^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}(\sqrt{1+z})$

Involving  $\sin^{-1}(\sqrt{z+1})$  and  $\sinh^{-1}(\sqrt{z})$

01.12.27.0154.01

$$\sin^{-1}(\sqrt{z+1}) = \frac{\pi}{2} - i \sinh^{-1}(\sqrt{z}) /; -\pi < \arg(z) \leq 0$$

01.12.27.1174.01

$$\sin^{-1}(\sqrt{z+1}) = i \sinh^{-1}(\sqrt{z}) + \frac{\pi}{2} /; 0 < \arg(z) \leq \pi$$

01.12.27.0155.01

$$\sin^{-1}(\sqrt{1+z}) = \frac{\pi}{2} - \frac{\sqrt{-z^2}}{z} \sinh^{-1}(\sqrt{z})$$

### Involving $\sin^{-1}\left(\frac{\sqrt{1+cz}}{\sqrt{2}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{2}}\right)$  and  $\sinh^{-1}(iz)$

01.12.27.1175.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{2}}\right) = \frac{1}{2} \left( \frac{\pi}{2} + i \sinh^{-1}(iz) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{1+z}}{\sqrt{2}}\right)$  and  $\sinh^{-1}(iz)$

01.12.27.1176.01

$$\sin^{-1}\left(\frac{\sqrt{1+z}}{\sqrt{2}}\right) = \frac{1}{2} \left( \frac{\pi}{2} - i \sinh^{-1}(iz) \right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right)$  and  $\sinh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0158.02

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\pi}{2} - i \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; 0 \leq \arg(z) < \pi \vee z < -1$$

01.12.27.1177.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = i \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) < 0$$

01.12.27.1178.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = i \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0159.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\sqrt{-z} \sqrt{z+1}}{\sqrt{-z-1} \sqrt{z}} \left( \frac{\pi}{2} - \sqrt{-\frac{1}{z}} \sqrt{z} \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right) \right)$$

01.12.27.1179.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\pi}{2} \sqrt{\frac{z}{z+1}} \sqrt{\frac{z+1}{z}} - \frac{z}{z+1} \sqrt{-\frac{(z+1)^2}{z^2}} \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right)$  and  $\sinh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1180.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\pi}{2} - i \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right); 0 \leq \arg(z) < \pi$$

01.12.27.1181.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = i \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1182.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = -i \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1183.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\sqrt{-z} \sqrt{z+1}}{\sqrt{-z-1} \sqrt{z}} \left( \frac{\pi}{2} - z \sqrt{-\frac{1}{z^2}} \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right)$  and  $\sinh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1184.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-z}}\right) = \frac{\pi}{2} - i \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right); \operatorname{Im}(z) \geq 0$$



01.12.27.1185.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-z}}\right) = \frac{\pi}{2} + i \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right); \operatorname{Im}(z) < 0$$

01.12.27.1186.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-z}}\right) = \frac{\pi}{2} - \sqrt{-\frac{1}{z}} \sqrt{z} \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right)$  and  $\sinh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1187.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-z}}\right) = \frac{\pi}{2} - i \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right); 0 \leq \arg(z) < \pi$$

01.12.27.1188.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-z}}\right) = \frac{\pi}{2} + i \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1189.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-z}}\right) = \frac{\pi}{2} - z \sqrt{-\frac{1}{z^2}} \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$  and  $\sinh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0156.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \frac{\pi}{2} - i \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right); \operatorname{Im}(z) \geq 0$$

01.12.27.1190.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \frac{\pi}{2} + i \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right); \operatorname{Im}(z) < 0$$

01.12.27.0157.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \frac{\pi}{2} - \sqrt{-\frac{1}{z}} \sqrt{z} \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$  and  $\sinh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1191.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \frac{\pi}{2} - i \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right); 0 \leq \arg(z) < \pi$$

01.12.27.1192.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \frac{\pi}{2} + i \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1193.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \frac{\pi}{2} - z \sqrt{-\frac{1}{z^2}} \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\sqrt{a z^c + 1}\right)$

Involving  $\sin^{-1}\left(\sqrt{a z^c + 1}\right)$  and  $\sinh^{-1}\left(\sqrt{a} z^{c/2}\right)$

01.12.27.0162.01

$$\sin^{-1}\left(\sqrt{z^2 + 1}\right) = \frac{\pi}{2} - i \sinh^{-1}(z); -\pi < \arg(z) \leq 0$$

01.12.27.1194.01

$$\sin^{-1}\left(\sqrt{z^2 + 1}\right) = i \sinh^{-1}(z) + \frac{\pi}{2}; 0 < \arg(z) \leq \pi$$

01.12.27.0163.01

$$\sin^{-1}\left(\sqrt{z^2 + 1}\right) = \frac{\pi}{2} - \frac{\sqrt{-z^2}}{z} \sinh^{-1}(z)$$

01.12.27.0170.01

$$\sin^{-1}\left(\sqrt{a z^c + 1}\right) = \frac{\sqrt{a} z^{c/2}}{\sqrt{-a z^c}} \sinh^{-1}\left(\sqrt{a} z^{c/2}\right) + \frac{\pi}{2}$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right)$  and  $\sinh^{-1}\left(\frac{1}{z}\right)$

01.12.27.0165.02

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{\pi}{2} - i \sinh^{-1}\left(\frac{1}{z}\right); 0 \leq \arg(z) < \frac{\pi}{2} \vee iz < -1$$

01.12.27.1195.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = i \sinh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2}; -\frac{\pi}{2} < \arg(z) < 0 \vee (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.1196.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = i \sinh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}; \frac{\pi}{2} < \arg(z) < \pi \vee (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.1197.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = -i \sinh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0) \vee (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0166.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{\pi \sqrt{z^2}}{2z} - \sqrt{-\frac{1}{z^2}} \sqrt{z^2} \sinh^{-1}\left(\frac{1}{z}\right); iz \notin (-1, 1)$$

01.12.27.0167.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{\sqrt{z^2+1}}{2z^2 \sqrt{-\frac{z^2+1}{z^4}}} \left( \pi \sqrt{-\frac{1}{z^2}} z + 2 \sinh^{-1}\left(\frac{1}{z}\right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right)$  and  $\sinh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1198.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = \frac{\pi}{2} - i \sinh^{-1}\left(\frac{1}{z}\right); 0 \leq \arg(z) < \frac{\pi}{2} \vee \frac{\pi}{2} < \arg(z) < \pi \vee (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.1199.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = i \sinh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2}; -\pi < \arg(z) < -\frac{\pi}{2} \vee -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0) \vee (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.1200.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = i \sinh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}; (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.1201.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = -i \sinh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}; (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.1202.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = \frac{\sqrt{-z^2(z^2+1)}}{\sqrt{z^2}\sqrt{-z^2-1}} \left(\frac{\pi}{2} - \sqrt{-\frac{1}{z^2}} z \sinh^{-1}\left(\frac{1}{z}\right)\right)$$

**Involving  $\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right)$**

Involving  $\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right)$  and  $\sinh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1203.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = \frac{\pi}{2} - i \sinh^{-1}\left(\frac{1}{z}\right); 0 \leq \arg(z) < \pi$$

01.12.27.1204.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = i \sinh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2}; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1205.01

$$\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi}{2} - \sqrt{-\frac{1}{z^2}} z \sinh^{-1}\left(\frac{1}{z}\right)$$

**Involving  $\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right)$**

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right)$  and  $\sinh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1206.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{\pi}{2} - i \sinh^{-1}\left(\frac{1}{z}\right); 0 \leq \arg(z) < \pi$$

01.12.27.1207.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = i \sinh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1208.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{\pi}{2} - \sqrt{-\frac{1}{z^2}} z \sinh^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(2z\sqrt{-1-z^2}\right)$

### Involving $\sin^{-1}\left(2z\sqrt{-1-z^2}\right)$ and $\sinh^{-1}(z)$

01.12.27.0164.01

$$\sin^{-1}\left(2z\sqrt{-z^2-1}\right) = \frac{2\sqrt{-z^4}}{z^2} \sinh^{-1}(z) /; |\arg(z)| \leq \frac{\pi}{4} \vee \frac{3\pi}{4} \leq |\arg(z)| \leq \pi$$

01.12.27.1209.01

$$\begin{aligned} \sin^{-1}\left(2z\sqrt{-z^2-1}\right) = & \frac{\pi\sqrt{2z^2+1}\sqrt{z^4+z^2}}{2\sqrt{z^2}\sqrt{-2z^2-1}\sqrt{z^2+1}} \left( -\frac{\sqrt{-z^2}}{z} - i\sqrt{\frac{i}{z}}\sqrt{-iz}\sqrt{\frac{1}{1-i\sqrt{2}z}}\sqrt{1-i\sqrt{2}z} + \right. \\ & \left. i\sqrt{-\frac{i}{z}}\sqrt{iz}\sqrt{\frac{1}{\sqrt{2}iz+1}}\sqrt{\sqrt{2}iz+1} - \frac{\sqrt{z^4+z^2}}{z\sqrt{-z^2-1}} \right) - \frac{2\sqrt{2z^2+1}\sqrt{z^4+z^2}}{\sqrt{z^2}\sqrt{-2z^2-1}\sqrt{z^2+1}} \sinh^{-1}(z) \end{aligned}$$

### Involving $\sin^{-1}\left(\frac{2\sqrt{-1-z^2}}{z^2}\right)$

### Involving $\sin^{-1}\left(\frac{2\sqrt{-1-z^2}}{z^2}\right)$ and $\sinh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1210.01

$$\sin^{-1}\left(\frac{2\sqrt{-1-z^2}}{z^2}\right) = \frac{2\sqrt{-z^2}}{z} \sinh^{-1}\left(\frac{1}{z}\right) /; |\arg(z)| \leq \frac{\pi}{4} \vee \frac{3\pi}{4} \leq |\arg(z)| \leq \pi \vee |z| \geq \sqrt{2}$$

01.12.27.1211.01

$$\sin^{-1}\left(\frac{2\sqrt{-z^2-1}}{z^2}\right) = \frac{z^3\sqrt{-z^2-2}\sqrt{-z^2-1}}{2\sqrt{1-iz}(iz+1)\sqrt{-z^4-3z^2-2}}\sqrt{\frac{z^2+1}{z^4}}\sqrt{\frac{i-z}{z}}\sqrt{-\frac{i}{z}}\left(\pi\left(-\frac{z^3}{z^2+1}\sqrt{-\frac{z^2+1}{z^2}}\sqrt{\frac{z^2+1}{z^4}}+\sqrt{-\frac{1}{z^2}}z+i\sqrt{\frac{z-i\sqrt{2}}{z}}\sqrt{-\frac{i}{z}}\sqrt{iz}\sqrt{\frac{z}{-i\sqrt{2}+z}}-i\sqrt{\frac{z+i\sqrt{2}}{z}}\sqrt{\frac{i}{z}}\sqrt{-iz}\sqrt{\frac{z}{i\sqrt{2}+z}}\right)+4\sinh^{-1}\left(\frac{1}{z}\right)\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+z^2}}{2}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+z^2}}{2}}\right)$  and  $\sinh^{-1}(z)$

01.12.27.0168.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+z^2}}{2}}\right) = \frac{i}{2}\sinh^{-1}(z) /; -\pi < \arg(z) \leq 0$$

01.12.27.1212.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}(1-\sqrt{z^2+1})}\right) = -\frac{1}{2}i\sinh^{-1}(z) /; 0 < \arg(z) \leq \pi$$

01.12.27.0169.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+z^2}}{2}}\right) = \frac{\sqrt{-z^2}}{2z}\sinh^{-1}(z)$$

Involving  $\sin^{-1}\left(z\sqrt{\frac{1-\sqrt{1+z^2}}{2}}/\sqrt{2z^2}\right)$

Involving  $\sin^{-1}\left(z\sqrt{\frac{1-\sqrt{1+z^2}}{2}}/\sqrt{2z^2}\right)$  and  $\sinh^{-1}(z)$

$$\text{01.12.27.1213.01} \quad \sin^{-1} \left( \frac{z \sqrt{1 - \sqrt{z^2 + 1}}}{\sqrt{2} \sqrt{z^2}} \right) = \frac{1}{2} i \sinh^{-1}(z) ; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\frac{\pi}{2} < \arg(z) \leq 0$$

$$\text{01.12.27.1214.01} \quad \sin^{-1} \left( \frac{z \sqrt{1 - \sqrt{z^2 + 1}}}{\sqrt{2} \sqrt{z^2}} \right) = -\frac{1}{2} i \sinh^{-1}(z) ; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

$$\text{01.12.27.1215.01} \quad \sin^{-1} \left( \frac{z \sqrt{1 - \sqrt{z^2 + 1}}}{\sqrt{2} \sqrt{z^2}} \right) = \frac{\sqrt{-z^4}}{2 z^2} \sinh^{-1}(z)$$

Involving  $\sin^{-1} \left( z \sqrt{\left(1 - \sqrt{1 + z^2}\right) / \left(2 z^2\right)} \right)$

Involving  $\sin^{-1} \left( z \sqrt{\left(1 - \sqrt{1 + z^2}\right) / \left(2 z^2\right)} \right)$  and  $\sinh^{-1}(z)$

$$\text{01.12.27.1216.01} \quad \sin^{-1} \left( z \sqrt{\frac{1 - \sqrt{z^2 + 1}}{2 z^2}} \right) = \frac{1}{2} i \sinh^{-1}(z) ; 0 \leq \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

$$\text{01.12.27.1217.01} \quad \sin^{-1} \left( z \sqrt{\frac{1 - \sqrt{z^2 + 1}}{2 z^2}} \right) = -\frac{1}{2} i \sinh^{-1}(z) ; \frac{\pi}{2} < \arg(z) < \pi \vee -\frac{\pi}{2} < \arg(z) < 0$$

$$\text{01.12.27.1218.01} \quad \sin^{-1} \left( z \sqrt{\frac{1 - \sqrt{z^2 + 1}}{2 z^2}} \right) = \frac{1}{2} \sqrt{-\frac{1}{z^2}} \sqrt{z^2} \sinh^{-1}(z)$$

Involving  $\sin^{-1} \left( \sqrt{z - \sqrt{z^2 + 1}} / \sqrt{2 z} \right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 + 1}}}{\sqrt{2z}}\right)$  and  $\sinh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1219.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 + 1}}}{\sqrt{2z}}\right) = \frac{1}{2} i \sinh^{-1}\left(\frac{1}{z}\right); 0 < \arg(z) < \frac{\pi}{2} \vee (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.1220.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 + 1}}}{\sqrt{2z}}\right) = -\frac{1}{2} i \sinh^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} < \arg(z) < 0 \vee (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.1221.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 + 1}}}{\sqrt{2z}}\right) = \frac{\pi}{2} - \frac{1}{2} i \sinh^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} < \arg(z) < \pi \vee (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.1222.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 + 1}}}{\sqrt{2z}}\right) = \frac{1}{2} i \sinh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2}; -\pi < \arg(z) < -\frac{\pi}{2} \vee (i z \in \mathbb{R} \wedge i z > 1) \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1223.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 + 1}}}{\sqrt{2z}}\right) = \frac{z^2}{2} \sqrt{-\frac{1}{z^4}} \sqrt{\frac{1}{z^2 + 1}} \sqrt{z^2 + 1} \sinh^{-1}\left(\frac{1}{z}\right) + \frac{1}{4} \pi \left(1 - z \sqrt{\frac{1}{z^2}} \sqrt{\frac{1}{z^2 + 1}} \sqrt{z^2 + 1}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{(z - \sqrt{1 + z^2})}}{(2z)}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{(z - \sqrt{1 + z^2})}}{(2z)}\right)$  and  $\sinh^{-1}\left(\frac{1}{z}\right)$



01.12.27.1224.01

$$\sin^{-1} \left( \sqrt{\frac{z - \sqrt{1+z^2}}{2z}} \right) = \frac{1}{2} i \sinh^{-1} \left( \frac{1}{z} \right); 0 < \arg(z) < \frac{\pi}{2} \vee (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.1225.01

$$\sin^{-1} \left( \sqrt{\frac{z - \sqrt{1+z^2}}{2z}} \right) = -\frac{1}{2} i \sinh^{-1} \left( \frac{1}{z} \right); -\frac{\pi}{2} < \arg(z) < 0 \vee (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.1226.01

$$\sin^{-1} \left( \sqrt{\frac{z - \sqrt{1+z^2}}{2z}} \right) = \frac{\pi}{2} - \frac{1}{2} i \sinh^{-1} \left( \frac{1}{z} \right); \frac{\pi}{2} < \arg(z) < \pi \vee (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.1227.01

$$\sin^{-1} \left( \sqrt{\frac{z - \sqrt{1+z^2}}{2z}} \right) = \frac{1}{2} i \sinh^{-1} \left( \frac{1}{z} \right) + \frac{\pi}{2}; -\pi < \arg(z) < -\frac{\pi}{2} \vee (i z \in \mathbb{R} \wedge i z > 1) \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1228.01

$$\sin^{-1} \left( \sqrt{\frac{z - \sqrt{1+z^2}}{2z}} \right) = \frac{z^2}{2} \sqrt{-\frac{1}{z^4}} \sqrt{\frac{1}{z^2+1}} \sqrt{z^2+1} \sinh^{-1} \left( \frac{1}{z} \right) + \frac{\pi}{4} \left( 1 - z \sqrt{\frac{1}{z^2}} \sqrt{\frac{1}{z^2+1}} \sqrt{z^2+1} \right)$$

**Involving  $\cosh^{-1}$**

**Involving  $\sin^{-1}(z)$**

**Involving  $\sin^{-1}(z)$  and  $\cosh^{-1}(z)$**

01.12.27.0171.02

$$\sin^{-1}(z) = \frac{\pi}{2} + i \cosh^{-1}(z); \operatorname{Im}(z) > 0 \vee 0 < z < 1$$

01.12.27.0172.02

$$\sin^{-1}(z) = \frac{\pi}{2} - i \cosh^{-1}(z); \operatorname{Im}(z) < 0 \vee z > 1$$

01.12.27.0173.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \frac{\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}(z)$$

**Involving  $\sin^{-1}(z)$  and  $\cosh^{-1}(-z)$**

01.12.27.1229.01

$$\sin^{-1}(z) = i \cosh^{-1}(-z) - \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1230.01

$$\sin^{-1}(z) = -i \cosh^{-1}(-z) - \frac{\pi}{2}; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > -1)$$

01.12.27.1231.01

$$\sin^{-1}(z) = \frac{\sqrt{1+z}}{\sqrt{-1-z}} \cosh^{-1}(-z) - \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\cosh^{-1}(1 - 2z^2)$ 

01.12.27.0176.01

$$\sin^{-1}(z) = -\frac{i}{2} \cosh^{-1}(1 - 2z^2); -\pi < \arg(z) \leq 0$$

01.12.27.1232.01

$$\sin^{-1}(z) = \frac{1}{2} i \cosh^{-1}(1 - 2z^2); 0 < \arg(z) \leq \pi$$

01.12.27.0177.01

$$\sin^{-1}(z) = -\frac{\sqrt{-z^2}}{2z} \cosh^{-1}(1 - 2z^2)$$

Involving  $\sin^{-1}(z)$  and  $\cosh^{-1}(2z^2 - 1)$ 

01.12.27.1233.01

$$\sin^{-1}(z) = \frac{1}{2} i \cosh^{-1}(2z^2 - 1) + \frac{\pi}{2}; 0 < \arg(z) \leq \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1234.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \frac{1}{2} i \cosh^{-1}(2z^2 - 1); -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1235.01

$$\sin^{-1}(z) = \frac{1}{2} i \cosh^{-1}(2z^2 - 1) - \frac{\pi}{2}; \frac{\pi}{2} < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1236.01

$$\sin^{-1}(z) = -\frac{1}{2} i \cosh^{-1}(2z^2 - 1) - \frac{\pi}{2}; -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1237.01

$$\sin^{-1}(z) = \frac{z\sqrt{z^2-1}}{2\sqrt{z^2-z^4}} \cosh^{-1}(2z^2-1) + \frac{\pi\sqrt{z^2}}{2z}$$

Involving  $\sin^{-1}(z)$  and  $\cosh^{-1}\left(\sqrt{\frac{1+z}{2}}\right)$ 

01.12.27.1238.01

$$\sin^{-1}(z) = 2i \cosh^{-1}\left(\sqrt{\frac{z+1}{2}}\right) + \frac{\pi}{2}; 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1239.01

$$\sin^{-1}(z) = -2i \cosh^{-1}\left(\sqrt{\frac{1+z}{2}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1240.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2\sqrt{-z^2} \sqrt{\frac{1}{z-1}} \sqrt{\frac{z-1}{z^2}} \cosh^{-1}\left(\sqrt{\frac{z+1}{2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\cosh^{-1}\left(\sqrt{\frac{1-z}{2}}\right)$

01.12.27.1241.01

$$\sin^{-1}(z) = -2i \cosh^{-1}\left(\sqrt{\frac{1-z}{2}}\right) - \frac{\pi}{2}; -\pi < \arg(z) \leq 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1242.01

$$\sin^{-1}(z) = 2i \cosh^{-1}\left(\sqrt{\frac{1-z}{2}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1243.01

$$\sin^{-1}(z) = 2\sqrt{-z^2} \sqrt{-\frac{1}{z+1}} \sqrt{-\frac{z+1}{z^2}} \cosh^{-1}\left(\sqrt{\frac{1-z}{2}}\right) - \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\cosh^{-1}\left(\sqrt{z^2}\right)$

01.12.27.1244.01

$$\sin^{-1}(z) = i \cosh^{-1}\left(\sqrt{z^2}\right) + \frac{\pi}{2}; 0 < \arg(z) \leq \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1245.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \cosh^{-1}\left(\sqrt{z^2}\right); -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1246.01

$$\sin^{-1}(z) = i \cosh^{-1}\left(\sqrt{z^2}\right) - \frac{\pi}{2}; \frac{\pi}{2} < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1247.01

$$\sin^{-1}(z) = -\frac{\pi}{2} - i \cosh^{-1}\left(\sqrt{z^2}\right); -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1248.01

$$\sin^{-1}(z) = \frac{\pi\sqrt{z^2}}{2z} - \frac{\sqrt{-z^2}}{z} \sqrt{\frac{z-1}{z+1}} \sqrt{\frac{z+1}{z-1}} \cosh^{-1}\left(\sqrt{z^2}\right)$$

Involving  $\sin^{-1}(z)$  and  $\cosh^{-1}\left(\sqrt{1-z^2}\right)$

01.12.27.0174.01

$$\sin^{-1}(z) = -i \cosh^{-1}\left(\sqrt{1-z^2}\right); -\pi < \arg(z) \leq 0$$

01.12.27.1249.01

$$\sin^{-1}(z) = i \cosh^{-1}\left(\sqrt{1-z^2}\right); 0 < \arg(z) \leq \pi$$

01.12.27.0175.01

$$\sin^{-1}(z) = -\frac{\sqrt{-z^2}}{z} \cosh^{-1}\left(\sqrt{1-z^2}\right)$$

Involving  $\sin^{-1}(z)$  and  $\cosh^{-1}\left(2z\sqrt{1-z^2}\right)$

01.12.27.1250.01

$$\sin^{-1}(z) = \frac{\pi}{4} - \frac{1}{2} i \cosh^{-1}\left(2z\sqrt{1-z^2}\right); \operatorname{Re}(z) > -\frac{1}{\sqrt{2}} \wedge \operatorname{Im}(z) < 0$$

01.12.27.1251.01

$$\sin^{-1}(z) = \frac{\pi}{4} + \frac{1}{2} i \cosh^{-1}\left(2z\sqrt{1-z^2}\right); \operatorname{Re}(z) > -\frac{1}{\sqrt{2}} \wedge \operatorname{Im}(z) > 0$$

01.12.27.1252.01

$$\sin^{-1}(z) = \frac{\pi}{4} - \frac{\sqrt{-z^2}}{2z} \cosh^{-1}\left(2z\sqrt{1-z^2}\right); \operatorname{Re}(z) > -\frac{1}{\sqrt{2}} \wedge z \notin (0, 1)$$

01.12.27.1253.01

$$\begin{aligned} \sin^{-1}(z) = & \frac{1}{4} \pi \left( \frac{\sqrt{z^2}}{z} - \sqrt{\frac{1}{z}} \sqrt{z} \sqrt{\frac{1}{\sqrt{2}z+1}} \sqrt{\sqrt{2}z+1} + \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{\frac{1}{1-\sqrt{2}z}} \sqrt{1-\sqrt{2}z} + \frac{\sqrt{z^4-z^2}}{z\sqrt{z^2-1}} \right) - \\ & \frac{\sqrt{-z^2} \sqrt{z^2-1} \sqrt{2z^2-1}}{2\sqrt{1-2z^2} \sqrt{z^4-z^2}} \left( \frac{\pi}{2} - \frac{1}{\sqrt{2z\sqrt{1-z^2}-1}} \sqrt{1-2z\sqrt{1-z^2}} \cosh^{-1}\left(2z\sqrt{1-z^2}\right) \right) \end{aligned}$$

Involving  $\sin^{-1}(z)$  and  $\cosh^{-1}\left(2\sqrt{-1+\frac{1}{z^2}}z^2\right)$

01.12.27.1254.01

$$\begin{aligned} \sin^{-1}(z) = & \frac{1}{4} \sqrt{1-2z^2} \sqrt{\frac{1}{1-2z^2}} \\ & \left( \pi \left( \sqrt{\frac{1}{z^2}} z - \sqrt{\frac{1}{\sqrt{2}z+1}} \sqrt{\sqrt{2}z+1} + \sqrt{\frac{1}{1-\sqrt{2}z}} \sqrt{1-\sqrt{2}z} \right) + 2z \sqrt{-\frac{1}{z^2}} \cosh^{-1}\left(2\sqrt{\frac{1}{z^2}-1}z^2\right) \right) \end{aligned}$$

## Involving $\sin^{-1}(\sqrt{cz})$

### Involving $\sin^{-1}(\sqrt{z})$ and $\cosh^{-1}(\sqrt{z})$

01.12.27.1255.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} + i \cosh^{-1}(\sqrt{z}) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < 1)$$

01.12.27.1256.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} - i \cosh^{-1}(\sqrt{z}) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1257.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} - \frac{\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}(\sqrt{z})$$

### Involving $\sin^{-1}(\sqrt{z})$ and $\cosh^{-1}\left(1/\sqrt{\frac{1}{z}}\right)$

01.12.27.1258.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} + i \cosh^{-1}\left(1/\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1259.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} - i \cosh^{-1}\left(1/\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1260.01

$$\sin^{-1}(\sqrt{z}) = i \cosh^{-1}\left(1/\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1261.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} \sqrt{z} \sqrt{\frac{1}{z}} - \frac{\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}\left(1/\sqrt{\frac{1}{z}}\right)$$

### Involving $\sin^{-1}(\sqrt{-z})$ and $\cosh^{-1}(\sqrt{1+z})$

01.12.27.1262.01

$$\sin^{-1}(\sqrt{-z}) = i \cosh^{-1}(\sqrt{z+1}) /; -\pi < \arg(z) \leq 0$$

01.12.27.1263.01

$$\sin^{-1}(\sqrt{-z}) = -i \cosh^{-1}(\sqrt{z+1}) /; 0 < \arg(z) \leq \pi$$

01.12.27.1264.01

$$\sin^{-1}(\sqrt{-z}) = \frac{\sqrt{-z}}{\sqrt{z}} \cosh^{-1}(\sqrt{z+1})$$

Involving  $\sin^{-1}(\sqrt{-z})$  and  $\cosh^{-1}(1 + 2z)$

01.12.27.1265.01

$$\sin^{-1}(\sqrt{-z}) = \frac{1}{2} i \cosh^{-1}(2z + 1) /; -\pi < \arg(z) \leq 0$$

01.12.27.1266.01

$$\sin^{-1}(\sqrt{-z}) = -\frac{1}{2} i \cosh^{-1}(2z + 1) /; 0 < \arg(z) \leq \pi$$

01.12.27.1267.01

$$\sin^{-1}(\sqrt{-z}) = \frac{\sqrt{-z^2}}{2z} \cosh^{-1}(2z + 1)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{cz}}\right)$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$  and  $\cosh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1268.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi}{2} - i \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < 1)$$

01.12.27.1269.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = i \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2} /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1270.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi}{2} - \frac{\sqrt{z-1}}{\sqrt{1-z}} \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$  and  $\cosh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1271.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi}{2} - i \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1272.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = i \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2} /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1273.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1274.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi}{2} \sqrt{z} \sqrt{\frac{1}{z} - \frac{\sqrt{z-1}}{\sqrt{1-z}}} \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right)$  and  $\cosh^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$

01.12.27.1275.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = i \cosh^{-1}\left(\sqrt{\frac{z+1}{z}}\right); \operatorname{Im}(z) > 0$$

01.12.27.1276.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -i \cosh^{-1}\left(\sqrt{\frac{z+1}{z}}\right); \operatorname{Im}(z) \leq 0$$

01.12.27.1277.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -\sqrt{-z} \sqrt{\frac{1}{z}} \cosh^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right)$  and  $\cosh^{-1}\left(\frac{z+2}{z}\right)$

01.12.27.1278.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -\frac{i}{2} \cosh^{-1}\left(\frac{z+2}{z}\right); \operatorname{Im}(z) \leq 0$$

01.12.27.1279.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{1}{2} i \cosh^{-1}\left(\frac{z+2}{z}\right); 0 < \arg(z) < \pi$$

01.12.27.1280.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -\frac{\sqrt{-z}}{2} \sqrt{\frac{1}{z}} \cosh^{-1}\left(\frac{z+2}{z}\right)$$

Involving  $\sin^{-1}\left(\sqrt{z^2}\right)$

Involving  $\sin^{-1}\left(\sqrt{z^2}\right)$  and  $\cosh^{-1}(z)$

01.12.27.1281.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = i \cosh^{-1}(z) + \frac{\pi}{2}; 0 < \arg(z) \leq \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1282.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = \frac{\pi}{2} - i \cosh^{-1}(z); -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1283.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = -i \cosh^{-1}(z) - \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) \leq \pi$$

01.12.27.1284.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = i \cosh^{-1}(z) - \frac{\pi}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0197.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = \frac{\pi}{2} - \frac{\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}(z) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0198.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = \frac{\sqrt{z^2}}{z} \left( \frac{\pi}{2} - \frac{\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}(z) \right)$$

### Involving $\sin^{-1}(a(bz^c)^m)$

Involving  $\sin^{-1}(a(bz^c)^m)$  and  $\cosh^{-1}(ab^m z^{mc})$

01.12.27.0196.01

$$\sin^{-1}(a(bz^c)^m) = \frac{(bz^c)^m}{b^m z^{mc}} \left( \frac{\pi}{2} - \frac{\sqrt{1-ab^m z^{mc}}}{\sqrt{ab^m z^{mc}-1}} \cosh^{-1}(ab^m z^{mc}) \right) /; 2m \in \mathbb{Z}$$

### Involving $\sin^{-1}(1-2z^2)$

Involving  $\sin^{-1}(1-2z^2)$  and  $\cosh^{-1}(z)$

01.12.27.0178.02

$$\sin^{-1}(1-2z^2) = -\frac{\pi}{2} - 2i \cosh^{-1}(z) /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee 0 < z < 1$$

01.12.27.1285.01

$$\sin^{-1}(1-2z^2) = 2i \cosh^{-1}(z) - \frac{\pi}{2} /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1286.01

$$\sin^{-1}(1-2z^2) = 2i \cosh^{-1}(z) + \frac{3\pi}{2} /; \frac{\pi}{2} < \arg(z) \leq \pi$$

01.12.27.1287.01

$$\sin^{-1}(1-2z^2) = \frac{3\pi}{2} - 2i \cosh^{-1}(z) /; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0179.01

$$\sin^{-1}(1-2z^2) = \pi \left( \frac{1}{2} - \frac{\sqrt{z^2}}{z} \right) + \frac{2\sqrt{z^2}\sqrt{1-z}}{z\sqrt{z-1}} \cosh^{-1}(z)$$



## Involving $\sin^{-1}(2z^2 - 1)$

Involving  $\sin^{-1}(2z^2 - 1)$  and  $\cosh^{-1}(z)$

01.12.27.1288.01

$$\sin^{-1}(2z^2 - 1) = \frac{\pi}{2} + 2i \cosh^{-1}(z) /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1289.01

$$\sin^{-1}(2z^2 - 1) = -2i \cosh^{-1}(z) + \frac{\pi}{2} /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1290.01

$$\sin^{-1}(2z^2 - 1) = -2i \cosh^{-1}(z) - \frac{3\pi}{2} /; \frac{\pi}{2} < \arg(z) \leq \pi$$

01.12.27.1291.01

$$\sin^{-1}(2z^2 - 1) = -\frac{3\pi}{2} + 2i \cosh^{-1}(z) /; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.1292.01

$$\sin^{-1}(2z^2 - 1) = -\pi \left( \frac{1}{2} - \frac{\sqrt{z^2}}{z} \right) - \frac{2\sqrt{z^2} \sqrt{1-z}}{z\sqrt{z-1}} \cosh^{-1}(z)$$

## Involving $\sin^{-1}\left(\frac{z^2-2}{z^2}\right)$

Involving  $\sin^{-1}\left(\frac{z^2-2}{z^2}\right)$  and  $\cosh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1293.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = 2i \cosh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1294.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = -2i \cosh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1295.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = \frac{3\pi}{2} - 2i \cosh^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} \leq \arg(z) < \pi$$

01.12.27.1296.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = 2i \cosh^{-1}\left(\frac{1}{z}\right) + \frac{3\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1297.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = \pi\left(\frac{1}{2} - \sqrt{\frac{1}{z^2}z}\right) + \frac{2z}{\sqrt{\frac{1}{z}-1}} \sqrt{1-\frac{1}{z}} \sqrt{\frac{1}{z^2}} \cosh^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(\frac{2-z^2}{z^2}\right)$

#### Involving $\sin^{-1}\left(\frac{2-z^2}{z^2}\right)$ and $\cosh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1298.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -2i \cosh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} /; 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1299.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = 2i \cosh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} /; -\frac{\pi}{2} \leq \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1300.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -\frac{3\pi}{2} + 2i \cosh^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} \leq \arg(z) < \pi$$

01.12.27.1301.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -2i \cosh^{-1}\left(\frac{1}{z}\right) - \frac{3\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1302.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -\pi\left(\frac{1}{2} - \sqrt{\frac{1}{z^2}z}\right) - \frac{2z}{\sqrt{\frac{1}{z}-1}} \sqrt{1-\frac{1}{z}} \sqrt{\frac{1}{z^2}} \cosh^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}(\sqrt{1-z})$

#### Involving $\sin^{-1}(\sqrt{1-z})$ and $\cosh^{-1}(\sqrt{z})$

01.12.27.1303.01

$$\sin^{-1}(\sqrt{1-z}) = i \cosh^{-1}(\sqrt{z}) /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0180.02

$$\sin^{-1}(\sqrt{1-z}) = -i \cosh^{-1}(\sqrt{z}) /; 0 < \arg(z) \leq \pi \vee 0 < z < 1$$

01.12.27.0181.01

$$\sin^{-1}(\sqrt{1-z}) = \frac{\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}(\sqrt{z})$$

### Involving $\sin^{-1}\left(\frac{\sqrt{1+cz}}{\sqrt{2}}\right)$

#### Involving $\sin^{-1}\left(\sqrt{\frac{1+z}{2}}\right)$ and $\cosh^{-1}(z)$

01.12.27.1304.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{2}}\right) = \frac{1}{2}(\pi - i \cosh^{-1}(z)) /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0182.02

$$\sin^{-1}\left(\sqrt{\frac{1+z}{2}}\right) = \frac{1}{2}(\pi + i \cosh^{-1}(z)) /; 0 < \arg(z) \leq \pi \vee 0 < z < 1$$

01.12.27.0183.01

$$\sin^{-1}\left(\sqrt{\frac{1+z}{2}}\right) = \frac{1}{2}\left(\pi - \frac{\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}(z)\right)$$

#### Involving $\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right)$ and $\cosh^{-1}(z)$

01.12.27.1305.01

$$\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right) = \frac{1}{2}i \cosh^{-1}(z) /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0184.02

$$\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right) = -\frac{i}{2} \cosh^{-1}(z) /; 0 < \arg(z) \leq \pi \vee 0 < z < 1$$

01.12.27.0185.01

$$\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right) = \frac{1}{2} \frac{\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}(z)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{z+a}}{\sqrt{z}}\right)$

#### Involving $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1306.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = i \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; 0 < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1307.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = -i \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1308.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \pi - i \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right); (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0188.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\sqrt{z-1}}{\sqrt{1-z}} \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right); |\arg(z)| < \pi$$

01.12.27.0189.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\pi}{2} \left(1 - \sqrt{\frac{1}{z}} \sqrt{z}\right) + \frac{\sqrt{z-1} \sqrt{z}}{\sqrt{1-z}} \sqrt{\frac{1}{z}} \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$  and  $\cosh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1309.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = i \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right); 0 < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1310.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = -i \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1) \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1311.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\sqrt{z-1}}{\sqrt{1-z}} \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right); |\arg(z)| < \pi$$

01.12.27.1312.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\sqrt{z-1} \sqrt{z}}{\sqrt{1-z}} \sqrt{\frac{1}{z}} \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right)$  and  $\cosh^{-1}\left(1 + \frac{2}{z}\right)$

01.12.27.1313.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\sqrt{-z} \sqrt{z+1}}{2 \sqrt{-z-1} \sqrt{z}} \left( \pi - z \sqrt{-\frac{1}{z^2}} \cosh^{-1}\left(1 + \frac{2}{z}\right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right)$  and  $\cosh^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$

01.12.27.1314.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{z+1}} \left( \frac{\pi}{2} - z \sqrt{-\frac{1}{z^2}} \cosh^{-1}\left(\sqrt{\frac{z+1}{z}}\right) \right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$  and  $\cosh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1315.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = i \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right); \operatorname{Im}(z) > 0$$

01.12.27.1316.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -i \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right); -\pi < \arg(z) \leq 0$$

01.12.27.1317.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \pi - i \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right); (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1318.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{1}{2} \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} \left( \frac{2\sqrt{z-1}\sqrt{z}}{\sqrt{1-z}} \sqrt{\frac{1}{z}} \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi \sqrt{\frac{1}{z}} \sqrt{z} + \pi \right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$ and $\cosh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1319.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = i \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) > 0$$

01.12.27.1320.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -i \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) \leq 0$$

01.12.27.1321.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -\sqrt{\frac{1}{z}} \sqrt{-z} \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

### Involving $\sin^{-1}\left(\sqrt{\frac{z+a}{z}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$  and  $\cosh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1322.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = i \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1323.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = -i \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1324.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \pi - i \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right); (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0186.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\sqrt{z-1}}{\sqrt{1-z}} \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right); |\arg(z)| < \pi$$

01.12.27.0187.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{1}{2} \left( 2 \sqrt{\frac{1}{z}} \sqrt{z} \frac{\sqrt{z-1}}{\sqrt{1-z}} \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi \sqrt{\frac{1}{z}} \sqrt{z} + \pi \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$  and  $\cosh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1325.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = i \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1326.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = -i \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1) \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1327.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\sqrt{z-1}}{\sqrt{1-z}} \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right); |\arg(z)| < \pi$$

01.12.27.1328.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \sqrt{\frac{1}{z}} \sqrt{z} \frac{\sqrt{z-1}}{\sqrt{1-z}} \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$  and  $\cosh^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$

01.12.27.1329.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \frac{\pi}{2} - z \sqrt{-\frac{1}{z^2}} \cosh^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{z+a}}{\sqrt{2z}}\right)$

#### Involving $\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right)$ and $\cosh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1330.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} \left( \pi - i \cosh^{-1}\left(\frac{1}{z}\right) \right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1331.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} \left( i \cosh^{-1}\left(\frac{1}{z}\right) + \pi \right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1) \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0192.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} \left( \pi - \frac{\sqrt{z-1}}{\sqrt{1-z}} \cosh^{-1}\left(\frac{1}{z}\right) \right); |\arg(z)| < \pi$$

01.12.27.0193.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} \sqrt{1 + \frac{1}{z}} \sqrt{\frac{z}{z+1}} \left( \pi - \frac{1}{\sqrt{\frac{1}{z} - 1}} \sqrt{1 - \frac{1}{z}} \cosh^{-1}\left(\frac{1}{z}\right) \right)$$

#### Involving $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right)$ and $\cosh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1332.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right) = \frac{1}{2} i \cosh^{-1}\left(\frac{1}{z}\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1333.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right) = -\frac{i}{2} \cosh^{-1}\left(\frac{1}{z}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1) \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0195.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right) = \frac{1}{2 \sqrt{\frac{1}{z} - 1}} \sqrt{1 - \frac{1}{z}} \cosh^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{a-z}}{\sqrt{-2z}}\right)$

#### Involving $\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-2z}}\right)$ and $\cosh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1334.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-2z}}\right) = \frac{1}{2}\left(\pi - i \cosh^{-1}\left(\frac{1}{z}\right)\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1335.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-2z}}\right) = \frac{1}{2}\left(\pi + i \cosh^{-1}\left(\frac{1}{z}\right)\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1) \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1336.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-2z}}\right) = \frac{1}{2}\left(\pi - \frac{1}{\sqrt{\frac{1}{z}-1}} \sqrt{1-\frac{1}{z}} \cosh^{-1}\left(\frac{1}{z}\right)\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right)$  and  $\cosh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1337.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = -\frac{1}{2}i \cosh^{-1}\left(\frac{1}{z}\right); \operatorname{Im}(z) \leq 0$$

01.12.27.1338.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = \frac{1}{2}i \cosh^{-1}\left(\frac{1}{z}\right); \operatorname{Im}(z) > 0$$

01.12.27.1339.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = -\frac{1}{2}\sqrt{\frac{1}{z}} \sqrt{-z} \cosh^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+a}{2z}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right)$  and  $\cosh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1340.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right) = \frac{1}{2}\left(\pi - i \cosh^{-1}\left(\frac{1}{z}\right)\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1341.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right) = \frac{1}{2}\left(i \cosh^{-1}\left(\frac{1}{z}\right) + \pi\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0) \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0190.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right) = \frac{1}{2}\left(\pi - \frac{\sqrt{z-1}}{\sqrt{1-z}} \cosh^{-1}\left(\frac{1}{z}\right)\right); |\arg(z)| < \pi$$



01.12.27.0191.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right) = \frac{1}{2} \left( \pi - \frac{1}{\sqrt{\frac{1}{z}-1}} \sqrt{1-\frac{1}{z}} \cosh^{-1}\left(\frac{1}{z}\right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right)$  and  $\cosh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1342.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right) = \frac{1}{2} i \cosh^{-1}\left(\frac{1}{z}\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1343.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right) = -\frac{1}{2} i \cosh^{-1}\left(\frac{1}{z}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0) \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0194.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right) = \frac{1}{2\sqrt{\frac{1}{z}-1}} \sqrt{1-\frac{1}{z}} \cosh^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\sqrt{cz^2+1}\right)$

Involving  $\sin^{-1}\left(\sqrt{z^2+1}\right)$  and  $\cosh^{-1}(1+2z^2)$

01.12.27.1344.01

$$\sin^{-1}\left(\sqrt{z^2+1}\right) = \frac{\pi}{2} - \frac{1}{2} i \cosh^{-1}(2z^2+1); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\frac{\pi}{2} < \arg(z) \leq 0$$

01.12.27.1345.01

$$\sin^{-1}\left(\sqrt{z^2+1}\right) = \frac{1}{2} i \cosh^{-1}(2z^2+1) + \frac{\pi}{2}; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.1346.01

$$\sin^{-1}\left(\sqrt{z^2+1}\right) = \frac{\pi}{2} - \frac{\sqrt{-z^4}}{2z^2} \cosh^{-1}(2z^2+1)$$

Involving  $\sin^{-1}\left(\sqrt{z^2+1}\right)$  and  $\cosh^{-1}\left(\sqrt{z^2+1}\right)$

01.12.27.1347.01

$$\sin^{-1}\left(\sqrt{z^2+1}\right) = \frac{\pi}{2} - i \cosh^{-1}\left(\sqrt{z^2+1}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\frac{\pi}{2} < \arg(z) \leq 0$$

01.12.27.1348.01

$$\sin^{-1}\left(\sqrt{z^2+1}\right) = i \cosh^{-1}\left(\sqrt{z^2+1}\right) + \frac{\pi}{2} /; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.1349.01

$$\sin^{-1}\left(\sqrt{z^2+1}\right) = \frac{\pi}{2} - \frac{\sqrt{-z^4}}{z^2} \cosh^{-1}\left(\sqrt{z^2+1}\right)$$

Involving  $\sin^{-1}\left(\sqrt{1-z^2}\right)$  and  $\cosh^{-1}(z)$

01.12.27.1350.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = -i \cosh^{-1}(z) /; 0 < \arg(z) \leq \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1351.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = i \cosh^{-1}(z) /; -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1352.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \pi + i \cosh^{-1}(z) /; \frac{\pi}{2} < \arg(z) \leq \pi$$

01.12.27.1353.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \pi - i \cosh^{-1}(z) /; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0199.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \frac{\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}(z) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0200.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \frac{\sqrt{z^2} \sqrt{1-z}}{z \sqrt{z-1}} \cosh^{-1}(z) + \frac{\pi}{2} \left(1 - \frac{\sqrt{z^2}}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2+a}}{z}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$  and  $\cosh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1354.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = i \cosh^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1355.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -i \cosh^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1356.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = i \cosh^{-1}\left(\frac{1}{z}\right) - \pi /; \frac{\pi}{2} < \arg(z) < \pi$$

01.12.27.1357.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -i \cosh^{-1}\left(\frac{1}{z}\right) - \pi /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0202.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi}{2} \left(\frac{\sqrt{z^2}}{z} - 1\right) + \frac{\sqrt{z-1}}{\sqrt{1-z}} \cosh^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) \neq 0 \wedge |\arg(z)| < \pi$$

01.12.27.0203.02

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi}{2} \left(\frac{\sqrt{z^2}}{z} - \sqrt{z^2} \sqrt{\frac{1}{z^2}}\right) + \frac{\sqrt{z^2}}{\sqrt{\frac{1-z}{z}}} \sqrt{\frac{z-1}{z}} \sqrt{\frac{1}{z^2}} \cosh^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right)$  and  $\cosh^{-1}(1+2z^{-2})$

01.12.27.1358.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{1}{2} \left(\pi - i \cosh^{-1}\left(1 + \frac{2}{z^2}\right)\right) /; 0 \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.1359.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{1}{2} \left(i \cosh^{-1}\left(1 + \frac{2}{z^2}\right) + \pi\right) /; -\frac{\pi}{2} < \arg(z) < 0 \vee (i z \in \mathbb{R} \wedge i z < -1) \vee (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.1360.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = -\frac{1}{2} \left(i \cosh^{-1}\left(1 + \frac{2}{z^2}\right) + \pi\right) /; \frac{\pi}{2} < \arg(z) < \pi \vee (-i z \in \mathbb{R} \wedge 0 < -i z < 1) \vee (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.1361.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{1}{2} \left(i \cosh^{-1}\left(1 + \frac{2}{z^2}\right) - \pi\right) /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1362.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{\sqrt{z^2+1}}{2z \sqrt{-\frac{z^2+1}{z^4}}} \left(\sqrt{\frac{1}{z^2}} \cosh^{-1}\left(1 + \frac{2}{z^2}\right) + \pi \sqrt{-\frac{1}{z^2}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right)$  and  $\cosh^{-1}\left(\sqrt{1+\frac{1}{z^2}}\right)$

01.12.27.1363.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{\pi}{2} - i \cosh^{-1}\left(\sqrt{1+\frac{1}{z^2}}\right) /; 0 \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.1364.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = i \cosh^{-1}\left(\sqrt{1+\frac{1}{z^2}}\right) + \frac{\pi}{2} /; -\frac{\pi}{2} < \arg(z) < 0 \vee (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.1365.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = -i \cosh^{-1}\left(\sqrt{1+\frac{1}{z^2}}\right) - \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) < \pi \vee (-i z \in \mathbb{R} \wedge 0 < -i z < 1) \vee (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.1366.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = i \cosh^{-1}\left(\sqrt{1+\frac{1}{z^2}}\right) - \frac{\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1367.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{\sqrt{z^2+1}}{2z\sqrt{-\frac{z^2+1}{z^4}}}\left(2\sqrt{\frac{1}{z^2}}\cosh^{-1}\left(\sqrt{1+\frac{1}{z^2}}\right) + \pi\sqrt{-\frac{1}{z^2}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$  and  $\cosh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1368.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = i \cosh^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1369.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = -i \cosh^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \leq \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1370.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = -i \cosh^{-1}\left(\frac{1}{z}\right) + \pi /; \frac{\pi}{2} \leq \arg(z) < \pi$$

01.12.27.1371.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = i \cosh^{-1}\left(\frac{1}{z}\right) + \pi /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1372.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi}{2} \left(1 - z \sqrt{\frac{1}{z^2}}\right) + \frac{z}{\sqrt{\frac{1-z}{z}}} \sqrt{\frac{z-1}{z}} \sqrt{\frac{1}{z^2}} \cosh^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{a-z^2}}{\sqrt{-z^2}}\right)$

### Involving $\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$ and $\cosh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1373.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = i \cosh^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) < \frac{\pi}{2}$$

01.12.27.1374.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -i \cosh^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \leq \arg(z) \leq 0$$

01.12.27.1375.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \pi - i \cosh^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} \leq \arg(z) < \pi$$

01.12.27.1376.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = i \cosh^{-1}\left(\frac{1}{z}\right) + \pi /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1377.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -i \cosh^{-1}\left(\frac{1}{z}\right) - \pi /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1378.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \sqrt{\frac{z^2-1}{z^2}} \sqrt{\frac{z^2}{z^2-1}} \left( \frac{\pi}{2} \left( 1 - \sqrt{\frac{1}{z^2}} z \right) + \frac{\sqrt{z-1} \sqrt{z}}{\sqrt{\frac{1-z}{z}}} \sqrt{\frac{1}{z^2}} \cosh^{-1}\left(\frac{1}{z}\right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right)$  and  $\cosh^{-1}\left(\frac{z^2+2}{z^2}\right)$

01.12.27.1379.01

$$\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi}{2} - \frac{1}{2} i \cosh^{-1}\left(\frac{z^2+2}{z^2}\right); 0 \leq \arg(z) < \frac{\pi}{2} \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1380.01

$$\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right) = \frac{1}{2} i \cosh^{-1}\left(\frac{z^2+2}{z^2}\right) + \frac{\pi}{2}; \frac{\pi}{2} \leq \arg(z) < \pi \vee -\frac{\pi}{2} \leq \arg(z) < 0$$

01.12.27.1381.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = \frac{\pi}{2} - \frac{1}{2} \left( z^2 \sqrt{-\frac{1}{z^4}} \right) \cosh^{-1}\left(\frac{z^2+2}{z^2}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right)$  and  $\cosh^{-1}\left(\sqrt{1+\frac{1}{z^2}}\right)$

01.12.27.1382.01

$$\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi}{2} - i \cosh^{-1}\left(\sqrt{1+\frac{1}{z^2}}\right); 0 \leq \arg(z) < \frac{\pi}{2} \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1383.01

$$\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi}{2} + i \cosh^{-1}\left(\sqrt{1+\frac{1}{z^2}}\right); \frac{\pi}{2} \leq \arg(z) < \pi \vee -\frac{\pi}{2} \leq \arg(z) < 0$$

01.12.27.1384.01

$$\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi}{2} - z^2 \sqrt{-\frac{1}{z^4}} \cosh^{-1}\left(\sqrt{1+\frac{1}{z^2}}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2+c}{z^2}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$  and  $\cosh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1385.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = i \cosh^{-1}\left(\frac{1}{z}\right); 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1386.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = -i \cosh^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} \leq \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1387.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \pi - i \cosh^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} \leq \arg(z) < \pi$$

01.12.27.1388.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = i \cosh^{-1}\left(\frac{1}{z}\right) + \pi; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1389.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi}{2} \left(1 - \sqrt{\frac{1}{z^2}} z\right) + \frac{\sqrt{z-1} \sqrt{z}}{\sqrt{\frac{1-z}{z}}} \sqrt{\frac{1}{z^2}} \cosh^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right)$  and  $\cosh^{-1}(1 + 2z^{-2})$

01.12.27.1390.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{1}{2} \left(\pi - i \cosh^{-1}\left(1 + \frac{2}{z^2}\right)\right); 0 \leq \arg(z) < \frac{\pi}{2} \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1391.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{1}{2} \left(i \cosh^{-1}\left(1 + \frac{2}{z^2}\right) + \pi\right); \frac{\pi}{2} \leq \arg(z) < \pi \vee -\frac{\pi}{2} \leq \arg(z) < 0$$

01.12.27.1392.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{\pi}{2} - \frac{1}{2} \left(z^2 \sqrt{-\frac{1}{z^4}}\right) \cosh^{-1}\left(1 + \frac{2}{z^2}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right)$  and  $\cosh^{-1}\left(\sqrt{z^{-2}+1}\right)$

01.12.27.1393.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{\pi}{2} - i \cosh^{-1}\left(\sqrt{1 + \frac{1}{z^2}}\right) ; 0 \leq \arg(z) < \frac{\pi}{2} \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1394.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{\pi}{2} + i \cosh^{-1}\left(\sqrt{1 + \frac{1}{z^2}}\right) ; \frac{\pi}{2} \leq \arg(z) < \pi \vee -\frac{\pi}{2} \leq \arg(z) < 0$$

01.12.27.1395.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{\pi}{2} - z^2 \sqrt{-\frac{1}{z^4}} \cosh^{-1}\left(\sqrt{1 + \frac{1}{z^2}}\right)$$

Involving  $\sin^{-1}\left(2z\sqrt{1-z^2}\right)$

Involving  $\sin^{-1}\left(2z\sqrt{1-z^2}\right)$  and  $\cosh^{-1}(z)$

01.12.27.1396.01

$$\sin^{-1}\left(2z\sqrt{1-z^2}\right) = \pi + 2i \cosh^{-1}(z) ; \frac{\pi}{4} \leq \arg(z) \leq \frac{3\pi}{4}$$

01.12.27.1397.01

$$\sin^{-1}\left(2z\sqrt{1-z^2}\right) = \pi - 2i \cosh^{-1}(z) ; -\frac{3\pi}{4} \leq \arg(z) \leq -\frac{\pi}{4}$$

01.12.27.0201.01

$$\sin^{-1}\left(2z\sqrt{1-z^2}\right) = \pi - 2 \frac{\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}(z) ; \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4}$$

01.12.27.1398.01

$$\begin{aligned} \sin^{-1}\left(2z\sqrt{1-z^2}\right) &= \frac{\pi \sqrt{1-2z^2} \sqrt{z^4-z^2}}{2 \sqrt{-z^2} \sqrt{z^2-1} \sqrt{2z^2-1}} \\ &\left( \frac{\sqrt{z^2}}{z} - \sqrt{\frac{1}{z}} \sqrt{z} \sqrt{\frac{1}{\sqrt{2}z+1}} \sqrt{\sqrt{2}z+1} + \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{\frac{1}{1-\sqrt{2}z}} \sqrt{1-\sqrt{2}z} + \frac{\sqrt{z^4-z^2}}{z \sqrt{z^2-1}} - 2 \right) + \\ &\frac{2 \sqrt{1-z} \sqrt{1-2z^2} \sqrt{z^4-z^2}}{\sqrt{z-1} \sqrt{-z^2} \sqrt{z^2-1} \sqrt{2z^2-1}} \cosh^{-1}(z) \end{aligned}$$



Involving  $\sin^{-1}\left(\frac{2\sqrt{-1+z^2}}{z^2}\right)$

Involving  $\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right)$  and  $\cosh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1399.01

$$\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = \frac{\sqrt{z^2}}{z} \pi - \frac{2\sqrt{z^2}}{z\sqrt{1-z}} \sqrt{z-1} \cosh^{-1}\left(\frac{1}{z}\right); |z| \geq \sqrt{2} \wedge \text{Im}(z) \neq 0$$

01.12.27.1400.01

$$\begin{aligned} \sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = & -\frac{z^3\sqrt{z^2-2}\sqrt{z^2-1}}{2\sqrt{1-z}(z+1)\sqrt{-z^4+3z^2-2}} \sqrt{\frac{1-z^2}{z^4}} \sqrt{\frac{1}{z}} \\ & \sqrt{-\frac{z+1}{z}} \left( \pi \left( \frac{z^3}{1-z^2} \sqrt{\frac{1-z^2}{z^2}} \sqrt{\frac{1-z^2}{z^4}} + \sqrt{\frac{1}{z^2}} z - \sqrt{\frac{1}{z}} \sqrt{\frac{z}{z+\sqrt{2}}} \sqrt{\frac{z+\sqrt{2}}{z}} \sqrt{z} + \right. \right. \\ & \left. \left. \sqrt{1-\frac{\sqrt{2}}{z}} \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{\frac{z}{z-\sqrt{2}}} - 2 \right) + \frac{4}{\sqrt{\frac{1}{z}-1}} \sqrt{1-\frac{1}{z}} \cosh^{-1}\left(\frac{1}{z}\right) \right) \end{aligned}$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+cz^2}}{2}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+z^2}}{2}}\right)$  and  $\cosh^{-1}(iz)$

01.12.27.1401.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}(1-\sqrt{z^2+1})}\right) = -\frac{1}{2} i \cosh^{-1}(iz) - \frac{\pi}{4}; 0 < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1402.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}(1-\sqrt{z^2+1})}\right) = \frac{1}{2} i \cosh^{-1}(iz) + \frac{\pi}{4}; -\frac{\pi}{2} < \arg(z) \leq 0 \vee (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.1403.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}(1-\sqrt{z^2+1})}\right) = \frac{1}{2} i \cosh^{-1}(iz) - \frac{\pi}{4}; \frac{\pi}{2} < \arg(z) \leq \pi$$

$$\text{01.12.27.1404.01} \\ \sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{z^2+1}\right)}\right) = \frac{\pi}{4} - \frac{1}{2}i \cosh^{-1}(iz) /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (iz \in \mathbb{R} \wedge iz > 1)$$

$$\text{01.12.27.1405.01} \\ \sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{z^2+1}\right)}\right) = \frac{\sqrt{1-iz}}{2\sqrt{iz-1}} \cosh^{-1}(iz) - \frac{\pi}{4} /; 0 < \arg(z) \leq \pi$$

$$\text{01.12.27.0204.01} \\ \sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+z^2}}{2}}\right) = \frac{\pi}{4} - \frac{\sqrt{1-iz}}{2\sqrt{iz-1}} \cosh^{-1}(iz) /; -\pi < \arg(z) \leq 0$$

$$\text{01.12.27.1406.01} \\ \sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{z^2+1}\right)}\right) = \frac{i\sqrt{-z^2}}{z} \left(\frac{\sqrt{1-iz} \cosh^{-1}(iz)}{2\sqrt{iz-1}} - \frac{\pi}{4}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2}}\right)$  and  $\cosh^{-1}(z)$

$$\text{01.12.27.1407.01} \\ \sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{1-z^2}\right)}\right) = \frac{1}{2}\left(i \cosh^{-1}(z) + \frac{\pi}{2}\right) /; 0 < \arg(z) \leq \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

$$\text{01.12.27.1408.01} \\ \sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{1-z^2}\right)}\right) = \frac{1}{2}\left(\frac{\pi}{2} - i \cosh^{-1}(z)\right) /; -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

$$\text{01.12.27.1409.01} \\ \sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{1-z^2}\right)}\right) = -\frac{1}{2}\left(i \cosh^{-1}(z) + \frac{\pi}{2}\right) /; \frac{\pi}{2} < \arg(z) \leq \pi$$

$$\text{01.12.27.1410.01} \\ \sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{1-z^2}\right)}\right) = \frac{1}{2}\left(i \cosh^{-1}(z) - \frac{\pi}{2}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

$$\text{01.12.27.0205.01} \\ \sin^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2}}\right) = \frac{1}{2}\left(\frac{\pi}{2} - \frac{\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}(z)\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

$$\text{01.12.27.1411.01} \\ \sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{1-z^2}\right)}\right) = \frac{1}{2}\left(\frac{\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}(z) - \frac{\pi}{2}\right) /; \operatorname{Re}(z) < 0 \vee \arg(z) = -\frac{\pi}{2}$$

01.12.27.0206.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2}}\right) = \frac{\sqrt{z^2}}{2z} \left(\frac{\pi}{2} - \frac{\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}(z)\right)$$

**Involving  $\sin^{-1}\left(z\sqrt{1-\sqrt{1-z^2}}/\sqrt{2z^2}\right)$**

**Involving  $\sin^{-1}\left(z\sqrt{1-\sqrt{1-z^2}}/\sqrt{2z^2}\right)$  and  $\cosh^{-1}(z)$**

01.12.27.1412.01

$$\sin^{-1}\left(\frac{z\sqrt{1-\sqrt{1-z^2}}}{\sqrt{2z^2}}\right) = \frac{1}{2} \left(i \cosh^{-1}(z) + \frac{\pi}{2}\right); 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1413.01

$$\sin^{-1}\left(\frac{z\sqrt{1-\sqrt{1-z^2}}}{\sqrt{2z^2}}\right) = \frac{1}{2} \left(\frac{\pi}{2} - i \cosh^{-1}(z)\right); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0207.01

$$\sin^{-1}\left(\frac{z\sqrt{1-\sqrt{1-z^2}}}{\sqrt{2z^2}}\right) = \frac{1}{2} \left(\frac{\pi}{2} - \frac{\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}(z)\right)$$

**Involving  $\sin^{-1}\left(z\sqrt{(1-\sqrt{1-z^2})/(2z^2)}\right)$**

**Involving  $\sin^{-1}\left(z\sqrt{(1-\sqrt{1-z^2})/(2z^2)}\right)$  and  $\cosh^{-1}(z)$**

01.12.27.1414.01

$$\sin^{-1}\left(z\sqrt{\frac{1-\sqrt{1-z^2}}{2z^2}}\right) = \frac{1}{2} \left(i \cosh^{-1}(z) + \frac{\pi}{2}\right); 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1415.01

$$\sin^{-1} \left( z \sqrt{\frac{1 - \sqrt{1 - z^2}}{2z^2}} \right) = \frac{1}{2} \left( \frac{\pi}{2} - i \cosh^{-1}(z) \right); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1416.01

$$\sin^{-1} \left( z \sqrt{\frac{1 - \sqrt{1 - z^2}}{2z^2}} \right) = \frac{1}{2} \left( \frac{\pi}{2} - \frac{\sqrt{1 - z}}{\sqrt{z - 1}} \cosh^{-1}(z) \right)$$

Involving  $\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right)$

Involving  $\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right)$  and  $\cosh^{-1} \left( \frac{1}{z} \right)$

01.12.27.1417.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = \frac{1}{2} \left( \frac{\pi}{2} - i \cosh^{-1} \left( \frac{1}{z} \right) \right); 0 < \arg(z) \leq \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1) \vee \arg(z) = -\frac{\pi}{2}$$

01.12.27.1418.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = \frac{1}{2} \left( i \cosh^{-1} \left( \frac{1}{z} \right) + \frac{\pi}{2} \right); -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1419.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = \frac{1}{2} \left( \frac{3\pi}{2} - i \cosh^{-1} \left( \frac{1}{z} \right) \right); \frac{\pi}{2} < \arg(z) < \pi$$

01.12.27.1420.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = \frac{1}{2} \left( i \cosh^{-1} \left( \frac{1}{z} \right) + \frac{3\pi}{2} \right); -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1421.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) = -\frac{1}{2} \left( i \cosh^{-1} \left( \frac{1}{z} \right) + \frac{3\pi}{2} \right); (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1422.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}} \right) =$$

$$\frac{\sqrt{z-1} \sqrt{-iz} \sqrt{z}}{2\sqrt{\frac{1}{z}-1}} \sqrt{\frac{i}{z}} \sqrt{-\frac{1}{z+1}} \sqrt{-\frac{z+1}{z^2}} \cosh^{-1} \left( \frac{1}{z} \right) - \frac{1}{4} \pi \sqrt{-\frac{1}{z+1}} \sqrt{-\frac{z+1}{z^2}} \left( \sqrt{\frac{i}{z}} \sqrt{-iz} z + z - \sqrt{z^2} \right)$$

Involving  $\sin^{-1} \left( \sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}} \right)$

Involving  $\sin^{-1} \left( \sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}} \right)$  and  $\cosh^{-1} \left( \frac{1}{z} \right)$

01.12.27.1423.01

$$\sin^{-1} \left( \sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}} \right) = \frac{1}{2} \left( \frac{\pi}{2} - i \cosh^{-1} \left( \frac{1}{z} \right) \right); 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1) \vee \arg(z) = -\frac{\pi}{2}$$

01.12.27.1424.01

$$\sin^{-1} \left( \sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}} \right) = \frac{1}{2} \left( i \cosh^{-1} \left( \frac{1}{z} \right) + \frac{\pi}{2} \right); -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1425.01

$$\sin^{-1} \left( \sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}} \right) = \frac{1}{2} \left( \frac{3\pi}{2} - i \cosh^{-1} \left( \frac{1}{z} \right) \right); \frac{\pi}{2} < \arg(z) < \pi$$

01.12.27.1426.01

$$\sin^{-1} \left( \sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}} \right) = \frac{1}{2} \left( i \cosh^{-1} \left( \frac{1}{z} \right) + \frac{3\pi}{2} \right); -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1427.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{z\sqrt{z^2} \sqrt{z-1} \sqrt{z+1}}{2\sqrt{1-z}} \sqrt{\frac{1}{z^2}} \sqrt{-\frac{1}{(z+1)^2}} \sqrt{-\frac{z+1}{z^2}} \cosh^{-1}\left(\frac{1}{z}\right) - \frac{1}{4}\pi \sqrt{\frac{1}{z}} \sqrt{z} \sqrt{-\frac{1}{(z+1)^2}} \sqrt{z+1} \sqrt{-\frac{z+1}{z^2}} \sqrt{iz} \sqrt{-\frac{i}{z}} \left(\sqrt{\frac{i}{z}} \sqrt{-iz} z + z - \sqrt{z^2}\right)$$

**Involving  $\tanh^{-1}$**

**Involving  $\sin^{-1}(z)$**

**Involving  $\sin^{-1}(z)$  and  $\tanh^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$**

01.12.27.1428.01

$$\sin^{-1}(z) = i \tanh^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) + \frac{\pi}{2} /; 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1) \vee \arg(z) = -\frac{\pi}{2}$$

01.12.27.1429.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \tanh^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1430.01

$$\sin^{-1}(z) = -\frac{\pi}{2} - i \tanh^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1431.01

$$\sin^{-1}(z) = i \tanh^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) - \frac{\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0) \vee \arg(z) = \frac{\pi}{2}$$

01.12.27.1432.01

$$\sin^{-1}(z) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2} - \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}} \tanh^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$$

**Involving  $\sin^{-1}(z)$  and  $\tanh^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$**

01.12.27.1433.01

$$\sin^{-1}(z) = i \tanh^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) + \frac{\pi}{2} /; 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1434.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \tanh^{-1} \left( \frac{\sqrt{z^2 - 1}}{\sqrt{z^2}} \right) /; -\frac{\pi}{2} \leq \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1435.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + i \tanh^{-1} \left( \frac{\sqrt{z^2 - 1}}{\sqrt{z^2}} \right) /; \frac{\pi}{2} \leq \arg(z) < \pi \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1436.01

$$\sin^{-1}(z) = -i \tanh^{-1} \left( \frac{\sqrt{z^2 - 1}}{\sqrt{z^2}} \right) - \frac{\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1437.01

$$\sin^{-1}(z) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2} - \frac{\sqrt{z^2 - z^4}}{z \sqrt{z^2 - 1}}} \tanh^{-1} \left( \frac{\sqrt{z^2 - 1}}{\sqrt{z^2}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tanh^{-1} \left( \frac{\sqrt{1-z^2}}{\sqrt{-z^2}} \right)$

01.12.27.1438.01

$$\sin^{-1}(z) = i \tanh^{-1} \left( \frac{\sqrt{1-z^2}}{\sqrt{-z^2}} \right) + \frac{\pi}{2} /; 0 < \arg(z) < \frac{\pi}{2}$$

01.12.27.1439.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \tanh^{-1} \left( \frac{\sqrt{1-z^2}}{\sqrt{-z^2}} \right) /; -\frac{\pi}{2} \leq \arg(z) \leq 0$$

01.12.27.1440.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + i \tanh^{-1} \left( \frac{\sqrt{1-z^2}}{\sqrt{-z^2}} \right) /; \frac{\pi}{2} \leq \arg(z) \leq \pi$$

01.12.27.1441.01

$$\sin^{-1}(z) = -i \tanh^{-1} \left( \frac{\sqrt{1-z^2}}{\sqrt{-z^2}} \right) - \frac{\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.1442.01

$$\sin^{-1}(z) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2} - \frac{\sqrt{-z}}{\sqrt{z}}} \tanh^{-1} \left( \frac{\sqrt{1-z^2}}{\sqrt{-z^2}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tanh^{-1} \left( \sqrt{\frac{z^2-1}{z^2}} \right)$

01.12.27.1443.01

$$\sin^{-1}(z) = i \tanh^{-1} \left( \sqrt{\frac{z^2 - 1}{z^2}} \right) + \frac{\pi}{2} /; 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1444.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \tanh^{-1} \left( \sqrt{\frac{z^2 - 1}{z^2}} \right) /; -\frac{\pi}{2} \leq \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1445.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + i \tanh^{-1} \left( \sqrt{\frac{z^2 - 1}{z^2}} \right) /; \frac{\pi}{2} \leq \arg(z) < \pi \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1446.01

$$\sin^{-1}(z) = -i \tanh^{-1} \left( \sqrt{\frac{z^2 - 1}{z^2}} \right) - \frac{\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1447.01

$$\sin^{-1}(z) = \frac{z \sqrt{z^2 - 1}}{\sqrt{z^2 - z^4}} \tanh^{-1} \left( \sqrt{\frac{z^2 - 1}{z^2}} \right) + \frac{\pi z}{2} \sqrt{\frac{1}{z^2}}$$

Involving  $\sin^{-1}(z)$  and  $\tanh^{-1} \left( \frac{z}{\sqrt{z^2 - 1}} \right)$

01.12.27.0208.02

$$\sin^{-1}(z) = i \tanh^{-1} \left( \frac{z}{\sqrt{z^2 - 1}} \right) /; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee -1 < z < 1$$

01.12.27.1448.01

$$\sin^{-1}(z) = -i \tanh^{-1} \left( \frac{z}{\sqrt{z^2 - 1}} \right) /; \frac{\pi}{2} < \arg(z) < \pi \vee -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1449.01

$$\sin^{-1}(z) = -i \tanh^{-1} \left( \frac{z}{\sqrt{z^2 - 1}} \right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1450.01

$$\sin^{-1}(z) = \pi - i \tanh^{-1} \left( \frac{z}{\sqrt{z^2 - 1}} \right) /; (z \in \mathbb{R} \wedge z > 1)$$



01.12.27.0209.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2 - 1}}{\sqrt{1 - z^2}} \tanh^{-1}\left(\frac{z}{\sqrt{z^2 - 1}}\right) - \frac{\pi}{2\sqrt{1 - z^2}} \left( (1 - z) \sqrt{\frac{1 + z}{1 - z}} - (1 + z) \sqrt{\frac{1 - z}{1 + z}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tanh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2 - 1}}\right)$

01.12.27.1451.01

$$\sin^{-1}(z) = i \tanh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2 - 1}}\right) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1452.01

$$\sin^{-1}(z) = -i \tanh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2 - 1}}\right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1453.01

$$\sin^{-1}(z) = \pi - i \tanh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2 - 1}}\right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1454.01

$$\sin^{-1}(z) = i \tanh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2 - 1}}\right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1455.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2} \sqrt{z^2 - 1}}{z \sqrt{1 - z^2}} \tanh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2 - 1}}\right) - \frac{\pi}{2} \left( \sqrt{\frac{1}{1 - z}} \sqrt{1 - z} - \sqrt{\frac{1}{z + 1}} \sqrt{z + 1} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tanh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1 - z^2}}\right)$

01.12.27.1456.01

$$\sin^{-1}(z) = i \tanh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1 - z^2}}\right) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1457.01

$$\sin^{-1}(z) = -i \tanh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1 - z^2}}\right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1458.01

$$\sin^{-1}(z) = \pi - i \tanh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1 - z^2}}\right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1459.01

$$\sin^{-1}(z) = i \tanh^{-1} \left( \frac{\sqrt{-z^2}}{\sqrt{1-z^2}} \right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1460.01

$$\sin^{-1}(z) = -\frac{\sqrt{-z^2}}{z} \tanh^{-1} \left( \frac{\sqrt{-z^2}}{\sqrt{1-z^2}} \right) - \frac{\pi}{2} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tanh^{-1} \left( \sqrt{\frac{z^2}{z^2-1}} \right)$

01.12.27.1461.01

$$\sin^{-1}(z) = i \tanh^{-1} \left( \sqrt{\frac{z^2}{z^2-1}} \right) /; \text{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1462.01

$$\sin^{-1}(z) = -i \tanh^{-1} \left( \sqrt{\frac{z^2}{z^2-1}} \right) /; \text{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1463.01

$$\sin^{-1}(z) = \pi - i \tanh^{-1} \left( \sqrt{\frac{z^2}{z^2-1}} \right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1464.01

$$\sin^{-1}(z) = i \tanh^{-1} \left( \sqrt{\frac{z^2}{z^2-1}} \right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1465.01

$$\sin^{-1}(z) = \frac{\sqrt{z}}{\sqrt{-z}} \tanh^{-1} \left( \sqrt{\frac{z^2}{z^2-1}} \right) - \frac{\pi}{2} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tanh^{-1} \left( \frac{2z\sqrt{z^2-1}}{1-2z^2} \right)$

01.12.27.0210.02

$$\sin^{-1}(z) = \frac{\sqrt{-z^4}}{2z^2} \tanh^{-1} \left( \frac{2z\sqrt{z^2-1}}{1-2z^2} \right) /; \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4}$$

01.12.27.1466.01

$$\sin^{-1}(z) = \frac{1}{4} \pi \left( \frac{\sqrt{z^2-1} z}{\sqrt{z^4-z^2}} + \sqrt{\frac{1}{z}} \sqrt{\frac{1}{\sqrt{2} z-1}} \sqrt{\sqrt{2} z-1} \sqrt{z} - \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{-\sqrt{2} z-1} \sqrt{-\frac{1}{\sqrt{2} z+1} + \frac{\sqrt{z^2}}{z}} \right) + \frac{\sqrt{1-z^2}}{2\sqrt{z^2-1}} \tanh^{-1} \left( \frac{2z\sqrt{z^2-1}}{1-2z^2} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tanh^{-1} \left( \frac{1-2z^2}{2z\sqrt{z^2-1}} \right)$

01.12.27.1467.01

$$\sin^{-1}(z) = \frac{\pi}{4} - \frac{1}{2} i \tanh^{-1} \left( \frac{1-2z^2}{2z\sqrt{z^2-1}} \right) /; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge 0 < z < 1) \bigvee (iz \in \mathbb{R} \wedge iz > 0)$$

01.12.27.1468.01

$$\sin^{-1}(z) = \frac{\pi}{4} + \frac{1}{2} i \tanh^{-1} \left( \frac{1-2z^2}{2z\sqrt{z^2-1}} \right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1469.01

$$\sin^{-1}(z) = -\frac{\pi}{4} + \frac{1}{2} i \tanh^{-1} \left( \frac{1-2z^2}{2z\sqrt{z^2-1}} \right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.12.27.1470.01

$$\sin^{-1}(z) = -\frac{\pi}{4} - \frac{1}{2} i \tanh^{-1} \left( \frac{1-2z^2}{2z\sqrt{z^2-1}} \right) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge -1 < z < 0) \bigvee (iz \in \mathbb{R} \wedge iz < 0)$$

01.12.27.1471.01

$$\sin^{-1}(z) = -\frac{3\pi}{4} + \frac{i}{2} \tanh^{-1} \left( \frac{1-2z^2}{2z\sqrt{z^2-1}} \right) /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1472.01

$$\sin^{-1}(z) = \frac{3\pi}{4} + \frac{i}{2} \tanh^{-1} \left( \frac{1-2z^2}{2z\sqrt{z^2-1}} \right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1473.01

$$\sin^{-1}(z) = \frac{\pi}{4} \left( -\sqrt{\frac{1}{1-z}} \sqrt{1-z} + \sqrt{\frac{1}{z+1}} \sqrt{z+1} - \sqrt{-iz} \sqrt{\frac{i}{z}} + \sqrt{-\frac{i}{z}} \sqrt{iz} + \frac{\sqrt{z^2}}{z} \right) - \frac{\sqrt{z^2-1}}{2\sqrt{1-z^2}} \tanh^{-1} \left( \frac{1-2z^2}{2z\sqrt{z^2-1}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tanh^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right)$

01.12.27.1474.01

$$\sin^{-1}(z) = 2i \tanh^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.1475.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2i \tanh^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1476.01

$$\sin^{-1}(z) = 2i \tanh^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) - \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1477.01

$$\sin^{-1}(z) = \frac{2\sqrt{z-1}}{\sqrt{1-z}} \tanh^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) - \frac{\pi\sqrt{-z-1}\sqrt{-z}}{\sqrt{z+1}} \sqrt{\frac{1}{z}} - \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\tanh^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right)$

01.12.27.1478.01

$$\sin^{-1}(z) = 2i \tanh^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) > 0$$

01.12.27.1479.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2i \tanh^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right); -\pi < \arg(z) \leq 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1480.01

$$\sin^{-1}(z) = 2i \tanh^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) - \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1481.01

$$\sin^{-1}(z) = \frac{2\sqrt{z+1}}{\sqrt{-z-1}} \tanh^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) - \pi \left( \frac{\sqrt{-z-1}\sqrt{-z}}{\sqrt{z+1}} \sqrt{\frac{1}{z}} + \frac{1}{2} \right)$$

Involving  $\sin^{-1}(z)$  and  $\tanh^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right)$

01.12.27.1482.01

$$\sin^{-1}(z) = 2i \tanh^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.1483.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2i \tanh^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1484.01

$$\sin^{-1}(z) = 2i \tanh^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) - \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1485.01

$$\sin^{-1}(z) = -2\sqrt{\frac{z+1}{z-1}}\sqrt{z-1}\sqrt{\frac{1}{z}}\sqrt{-\frac{z}{z+1}}\tanh^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) - \frac{\pi}{2} - \frac{\pi\sqrt{-z-1}\sqrt{-z}}{\sqrt{z+1}}\sqrt{\frac{1}{z}}$$

Involving  $\sin^{-1}(z)$  and  $\tanh^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right)$

01.12.27.1486.01

$$\sin^{-1}(z) = 2i \tanh^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < 1)$$

01.12.27.1487.01

$$\sin^{-1}(z) = -2i \tanh^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) < 0$$

01.12.27.1488.01

$$\sin^{-1}(z) = \frac{3\pi}{2} - 2i \tanh^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right); (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1489.01

$$\sin^{-1}(z) = \frac{2\sqrt{z-1}}{\sqrt{1-z}}\tanh^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) + \frac{\pi\sqrt{z-1}\sqrt{z}}{\sqrt{1-z}}\sqrt{-\frac{1}{z}} + \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\tanh^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right)$

01.12.27.1490.01

$$\sin^{-1}(z) = 2i \tanh^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1491.01

$$\sin^{-1}(z) = -2i \tanh^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.1492.01

$$\sin^{-1}(z) = \frac{3\pi}{2} - 2i \tanh^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right); (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1493.01

$$\sin^{-1}(z) = \pi \left( \frac{\sqrt{z-1} \sqrt{z}}{\sqrt{1-z}} \sqrt{-\frac{1}{z} + \frac{1}{2}} + \frac{2\sqrt{z+1}}{\sqrt{-z-1}} \tanh^{-1} \left( \frac{\sqrt{-z-1}}{\sqrt{1-z}} \right) \right)$$

Involving  $\sin^{-1}(z)$  and  $\tanh^{-1} \left( \sqrt{\frac{z+1}{z-1}} \right)$

01.12.27.1494.01

$$\sin^{-1}(z) = 2i \tanh^{-1} \left( \sqrt{\frac{z+1}{z-1}} \right) - \frac{\pi}{2} /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1495.01

$$\sin^{-1}(z) = -2i \tanh^{-1} \left( \sqrt{\frac{z+1}{z-1}} \right) - \frac{\pi}{2} /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.1496.01

$$\sin^{-1}(z) = \frac{3\pi}{2} - 2i \tanh^{-1} \left( \sqrt{\frac{z+1}{z-1}} \right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1497.01

$$\sin^{-1}(z) = 2\sqrt{-z-1} \sqrt{\frac{z}{1-z}} \sqrt{-\frac{1}{z}} \sqrt{\frac{z-1}{z+1}} \tanh^{-1} \left( \sqrt{\frac{z+1}{z-1}} \right) + \frac{\pi\sqrt{z-1}\sqrt{z}}{\sqrt{1-z}} \sqrt{-\frac{1}{z}} + \frac{\pi}{2}$$

Involving  $\sin^{-1} \left( \frac{2z}{z^2+1} \right)$

Involving  $\sin^{-1} \left( \frac{2z}{z^2+1} \right)$  and  $\tanh^{-1}(iz)$

01.12.27.1498.01

$$\sin^{-1} \left( \frac{2z}{z^2+1} \right) = -2i \tanh^{-1}(iz) /; |z| < 1$$

01.12.27.1499.01

$$\sin^{-1} \left( \frac{2z}{z^2+1} \right) = \pi + 2i \tanh^{-1}(iz) /; |z| > 1 \wedge -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1500.01

$$\sin^{-1} \left( \frac{2z}{z^2+1} \right) = 2i \tanh^{-1}(iz) - \pi /; |z| > 1 \wedge \left( \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \right)$$

01.12.27.1501.01

$$\sin^{-1} \left( \frac{2z}{z^2+1} \right) = \frac{\pi\sqrt{z^2}}{z} + 2i \tanh^{-1}(iz) /; |z| > 1$$

01.12.27.1502.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \frac{\pi\sqrt{z^2}}{2z} \left(1 - \frac{1-z}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2}\right) - \frac{2i(1-z)}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2} \tanh^{-1}(iz)$$

Involving  $\sin^{-1}\left(\frac{2z}{z^2+1}\right)$  and  $\tanh^{-1}\left(\frac{i}{z}\right)$

01.12.27.1503.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \pi + 2i \tanh^{-1}\left(\frac{i}{z}\right); |z| < 1 \wedge -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.1504.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = 2i \tanh^{-1}\left(\frac{i}{z}\right) - \pi; |z| < 1 \wedge \left(\frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}\right)$$

01.12.27.1505.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \pi z \sqrt{\frac{1}{z^2}} + 2i \tanh^{-1}\left(\frac{i}{z}\right); |z| < 1$$

01.12.27.1506.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = -2i \tanh^{-1}\left(\frac{i}{z}\right); |z| > 1$$

01.12.27.1507.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2}} \left(\frac{1-z}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2} + 1\right) + \frac{2i(1-z)}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2} \tanh^{-1}\left(\frac{i}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{2z}{z^2+1}\right)$  and  $\tanh^{-1}(iz^r)$

01.12.27.1508.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = -2i \tanh^{-1}\left(iz \frac{\sqrt{\left(\frac{z+1}{z-1}\right)^2}}{z+1}\right)$$

Involving  $\sin^{-1}\left(\frac{1-z}{1+z}\right)$

Involving  $\sin^{-1}\left(\frac{1-z}{1+z}\right)$  and  $\tanh^{-1}(\sqrt{-z})$

01.12.27.1509.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = -2i \tanh^{-1}(\sqrt{-z}) + \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1510.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{\pi}{2} + 2i \tanh^{-1}(\sqrt{-z}); -\pi < \arg(z) \leq 0$$

01.12.27.1511.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = 2i \tanh^{-1}(\sqrt{-z}) - \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1512.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \pi \left( \sqrt{1+z} \sqrt{\frac{1}{1+z} - \frac{1}{2}} \right) + \frac{2\sqrt{-(1+z)z}}{\sqrt{z}} \sqrt{\frac{1}{1+z}} \tanh^{-1}(\sqrt{-z})$$

Involving  $\sin^{-1}\left(\frac{1-z}{1+z}\right)$  and  $\tanh^{-1}\left(\frac{1}{\sqrt{-z}}\right)$

01.12.27.1513.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = -2i \tanh^{-1}\left(\frac{1}{\sqrt{-z}}\right) - \frac{\pi}{2} /; \text{Im}(z) > 0$$

01.12.27.1514.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = 2i \tanh^{-1}\left(\frac{1}{\sqrt{-z}}\right) - \frac{\pi}{2} /; -\pi < \arg(z) \leq 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1515.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{3\pi}{2} - 2i \tanh^{-1}\left(\frac{1}{\sqrt{-z}}\right) /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1516.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{1}{2} \pi \left( 2 \sqrt{\frac{1}{1+z}} \sqrt{1+z} - 2 \sqrt{\frac{1}{z}} \sqrt{z} - 1 \right) + \frac{2\sqrt{-(1+z)z}}{\sqrt{z}} \sqrt{\frac{1}{1+z}} \tanh^{-1}\left(\frac{1}{\sqrt{-z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1-z}{1+z}\right)$  and  $\tanh^{-1}\left(\sqrt{-\frac{1}{z}}\right)$

01.12.27.1517.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = 2i \tanh^{-1}\left(\sqrt{-\frac{1}{z}}\right) - \frac{\pi}{2} /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1518.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = -2i \tanh^{-1}\left(\sqrt{-\frac{1}{z}}\right) - \frac{\pi}{2} /; 0 \leq \arg(z) < \pi$$

01.12.27.1519.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{3\pi}{2} - 2i \tanh^{-1}\left(\sqrt{-\frac{1}{z}}\right) /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1520.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{\pi}{2} \left( 2 \sqrt{\frac{1}{1+z}} \sqrt{1+z} - 2 \sqrt{\frac{1}{z}} \sqrt{z} - 1 \right) - 2 \sqrt{\frac{-1-z}{z}} \sqrt{\frac{1}{1+z}} \sqrt{z} \tanh^{-1}\left(\sqrt{-\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{z-1}{z+1}\right)$



Involving  $\sin^{-1}\left(\frac{z-1}{z+1}\right)$  and  $\tanh^{-1}(\sqrt{-z})$

01.12.27.1521.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = 2i \tanh^{-1}(\sqrt{-z}) - \frac{\pi}{2} /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1522.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\frac{\pi}{2} - 2i \tanh^{-1}(\sqrt{-z}) /; -\pi < \arg(z) \leq 0$$

01.12.27.1523.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -2i \tanh^{-1}(\sqrt{-z}) + \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1524.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\pi \left( \sqrt{1+z} \sqrt{\frac{1}{1+z} - \frac{1}{2}} - \frac{2\sqrt{-(1+z)z}}{\sqrt{z}} \sqrt{\frac{1}{1+z}} \tanh^{-1}(\sqrt{-z}) \right)$$

Involving  $\sin^{-1}\left(\frac{z-1}{z+1}\right)$  and  $\tanh^{-1}\left(\frac{1}{\sqrt{-z}}\right)$

01.12.27.1525.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = 2i \tanh^{-1}\left(\frac{1}{\sqrt{-z}}\right) + \frac{\pi}{2} /; \operatorname{Im}(z) > 0$$

01.12.27.1526.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -2i \tanh^{-1}\left(\frac{1}{\sqrt{-z}}\right) + \frac{\pi}{2} /; -\pi < \arg(z) \leq 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1527.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\frac{3\pi}{2} + 2i \tanh^{-1}\left(\frac{1}{\sqrt{-z}}\right) /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1528.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = \frac{1}{2}\pi \left( -2\sqrt{\frac{1}{1+z}} \sqrt{1+z} + 2\sqrt{\frac{1}{z}} \sqrt{z} + 1 \right) - \frac{2\sqrt{-(1+z)z}}{\sqrt{z}} \sqrt{\frac{1}{1+z}} \tanh^{-1}\left(\frac{1}{\sqrt{-z}}\right)$$

Involving  $\sin^{-1}\left(\frac{z-1}{z+1}\right)$  and  $\tanh^{-1}\left(\sqrt{-\frac{1}{z}}\right)$

01.12.27.1529.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -2i \tanh^{-1}\left(\sqrt{-\frac{1}{z}}\right) + \frac{\pi}{2} /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1530.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = 2i \tanh^{-1}\left(\sqrt{-\frac{1}{z}}\right) + \frac{\pi}{2} /; 0 \leq \arg(z) < \pi$$

01.12.27.1531.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\frac{3\pi}{2} + 2i \tanh^{-1}\left(\sqrt{-\frac{1}{z}}\right); (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1532.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = \frac{\pi}{2} \left( -2\sqrt{\frac{1}{1+z}} \sqrt{1+z} + 2\sqrt{\frac{1}{z}} \sqrt{z+1} \right) + 2\sqrt{\frac{-1-z}{z}} \sqrt{\frac{1}{1+z}} \sqrt{z} \tanh^{-1}\left(\sqrt{-\frac{1}{z}}\right)$$

### Involving $\sin^{-1}\left(\frac{1+z}{1-z}\right)$

#### Involving $\sin^{-1}\left(\frac{1+z}{1-z}\right)$ and $\tanh^{-1}(\sqrt{z})$

01.12.27.1533.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = 2i \tanh^{-1}(\sqrt{z}) + \frac{\pi}{2}; 0 < \arg(z) \leq \pi$$

01.12.27.1534.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = \frac{\pi}{2} - 2i \tanh^{-1}(\sqrt{z}); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1535.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = 2i \tanh^{-1}(\sqrt{z}) - \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1536.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \pi \left( \sqrt{1-z} \sqrt{\frac{1}{1-z}} - \frac{1}{2} \right) + \frac{2\sqrt{(1-z)z}}{\sqrt{-z}} \sqrt{\frac{1}{1-z}} \tanh^{-1}(\sqrt{z})$$

#### Involving $\sin^{-1}\left(\frac{1+z}{1-z}\right)$ and $\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1537.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = 2i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2}; 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1538.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = -2i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) < 0$$

01.12.27.1539.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = \frac{3\pi}{2} - 2i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right); (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1540.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \frac{1}{2}\pi \left( 2\sqrt{\frac{1}{1-z}} \sqrt{1-z} - 2\sqrt{-\frac{1}{z}} \sqrt{-z} - 1 \right) + \frac{2\sqrt{(1-z)z}}{\sqrt{-z}} \sqrt{\frac{1}{1-z}} \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1+z}{1-z}\right)$  and  $\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1541.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = 2i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2}; 0 < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1542.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = -2i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1543.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = \frac{3\pi}{2} - 2i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right); (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1544.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \frac{\pi}{2} \left( 2\sqrt{\frac{1}{1-z}} \sqrt{1-z} - 2\sqrt{-\frac{1}{z}} \sqrt{-z} - 1 \right) - 2\sqrt{\frac{1-z}{z}} \sqrt{\frac{1}{1-z}} \sqrt{-z} \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{z+1}{z-1}\right)$

Involving  $\sin^{-1}\left(\frac{z+1}{z-1}\right)$  and  $\tanh^{-1}(\sqrt{z})$

01.12.27.1545.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2i \tanh^{-1}(\sqrt{z}) - \frac{\pi}{2}; 0 < \arg(z) \leq \pi$$

01.12.27.1546.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{\pi}{2} + 2i \tanh^{-1}(\sqrt{z}); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1547.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2i \tanh^{-1}(\sqrt{z}) + \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1548.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\pi \left( \sqrt{1-z} \sqrt{\frac{1}{1-z}} - \frac{1}{2} \right) - \frac{2\sqrt{(1-z)z}}{\sqrt{-z}} \sqrt{\frac{1}{1-z}} \tanh^{-1}(\sqrt{z})$$

Involving  $\sin^{-1}\left(\frac{z+1}{z-1}\right)$  and  $\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1549.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2}; 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1550.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = 2i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2} /; \operatorname{Im}(z) < 0$$

01.12.27.1551.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{3\pi}{2} + 2i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1552.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{1}{2}\pi \left( 2\sqrt{\frac{1}{1-z}}\sqrt{1-z} - 2\sqrt{-\frac{1}{z}}\sqrt{-z} - 1 \right) - \frac{2\sqrt{(1-z)z}}{\sqrt{-z}}\sqrt{\frac{1}{1-z}}\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{z+1}{z-1}\right)$  and  $\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1553.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2} /; 0 < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1554.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = 2i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2} /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1555.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{3\pi}{2} + 2i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1556.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{\pi}{2} \left( 2\sqrt{\frac{1}{1-z}}\sqrt{1-z} - 2\sqrt{-\frac{1}{z}}\sqrt{-z} - 1 \right) + 2\sqrt{\frac{1-z}{z}}\sqrt{\frac{1}{1-z}}\sqrt{-z}\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right)$

Involving  $\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right)$  and  $\tanh^{-1}(z)$

01.12.27.0211.02

$$\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right) = 2i \tanh^{-1}(z) + \frac{\pi}{2} /; \operatorname{Im}(z) > 0 \vee -1 < z < 0$$

01.12.27.1557.01

$$\sin^{-1}\left(\frac{z^2+1}{1-z^2}\right) = \frac{\pi}{2} - 2i \tanh^{-1}(z) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1558.01

$$\sin^{-1}\left(\frac{z^2+1}{1-z^2}\right) = 2i \tanh^{-1}(z) - \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1559.01

$$\sin^{-1}\left(\frac{z^2+1}{1-z^2}\right) = -2i \tanh^{-1}(z) - \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0212.01

$$\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right) = \frac{\pi}{2} - \frac{2\sqrt{-z^2}}{z} \tanh^{-1}(z) /; z \notin (-\infty, -1) \wedge z \notin (1, \infty)$$

01.12.27.1560.01

$$\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right) = \frac{\pi}{2} \left( 2\sqrt{\frac{1}{1-z}} \sqrt{1-z} + 2\sqrt{\frac{1}{z+1}} \sqrt{z+1} - 3 \right) - \frac{2\sqrt{-z^2}}{z} \sqrt{\frac{1-z}{z+1}} \sqrt{\frac{z+1}{1-z}} \tanh^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right)$  and  $\tanh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1561.01

$$\sin^{-1}\left(\frac{z^2+1}{1-z^2}\right) = 2i \tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; \text{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1562.01

$$\sin^{-1}\left(\frac{z^2+1}{1-z^2}\right) = -2i \tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; \text{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1563.01

$$\sin^{-1}\left(\frac{z^2+1}{1-z^2}\right) = \frac{3\pi}{2} - 2i \tanh^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1564.01

$$\sin^{-1}\left(\frac{z^2+1}{1-z^2}\right) = \frac{3\pi}{2} + 2i \tanh^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1565.01

$$\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right) = \frac{1}{2}\pi \left( 3 - 2\sqrt{\frac{1}{1-z}} \sqrt{1-z} \sqrt{-\frac{1}{z}} \sqrt{-z} - 2\sqrt{\frac{1}{z}} \sqrt{z} \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right) - \frac{2\sqrt{-z^2}}{z} \sqrt{\frac{1-z}{z+1}} \sqrt{\frac{z+1}{1-z}} \tanh^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right)$

Involving  $\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right)$  and  $\tanh^{-1}(z)$

01.12.27.1566.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -2i \tanh^{-1}(z) - \frac{\pi}{2} /; \text{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1567.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -\frac{\pi}{2} + 2i \tanh^{-1}(z) \ ; \ \text{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1568.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -2i \tanh^{-1}(z) + \frac{3\pi}{2} \ ; \ (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1569.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = 2i \tanh^{-1}(z) + \frac{3\pi}{2} \ ; \ (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1570.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -\frac{\pi}{2} + \frac{2\sqrt{-z^2}}{z} \tanh^{-1}(z) \ ; \ z \notin (-\infty, -1) \wedge z \notin (1, \infty)$$

01.12.27.1571.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -\frac{\pi}{2} \left( 2\sqrt{\frac{1}{1-z}} \sqrt{1-z} + 2\sqrt{\frac{1}{z+1}} \sqrt{z+1} - 3 \right) + \frac{2\sqrt{-z^2}}{z} \sqrt{\frac{1-z}{z+1}} \sqrt{\frac{z+1}{1-z}} \tanh^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right)$  and  $\tanh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1572.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -2i \tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} \ ; \ \text{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1573.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = 2i \tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} \ ; \ \text{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1574.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -\frac{3\pi}{2} + 2i \tanh^{-1}\left(\frac{1}{z}\right) \ ; \ (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1575.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -\frac{3\pi}{2} - 2i \tanh^{-1}\left(\frac{1}{z}\right) \ ; \ (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1576.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -\frac{1}{2}\pi \left( 3 - 2\sqrt{\frac{1}{1-z}} \sqrt{1-z} \sqrt{-\frac{1}{z}} \sqrt{-z} - 2\sqrt{\frac{1}{z}} \sqrt{z} \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right) + \frac{2\sqrt{-z^2}}{z} \sqrt{\frac{1-z}{z+1}} \sqrt{\frac{z+1}{1-z}} \tanh^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$  and  $\tanh^{-1}(\sqrt{z})$

01.12.27.1577.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = i \tanh^{-1}(\sqrt{z}) + \frac{\pi}{2}; 0 < \arg(z) \leq \pi$$

01.12.27.0213.02

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\pi}{2} - i \tanh^{-1}(\sqrt{z}); -\pi < \arg(z) \leq 0$$

01.12.27.0214.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\pi}{2} - \frac{\sqrt{-z^2}}{z} \tanh^{-1}(\sqrt{z})$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$  and  $\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1578.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1579.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right); 0 < \arg(z) \leq \pi$$

01.12.27.1580.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \pi - i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right); (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1581.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\sqrt{z}}{\sqrt{-z}} \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2} \left( \sqrt{-z} \sqrt{-\frac{1}{z}} \sqrt{1-z} \sqrt{\frac{1}{1-z}} - 1 \right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$  and  $\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1582.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) > 0$$

01.12.27.1583.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1) \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1584.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \pi - i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right); (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1585.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -\sqrt{-z} \sqrt{\frac{1}{z}} \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2} \left(\sqrt{-z} \sqrt{-\frac{1}{z}} \sqrt{1-z} \sqrt{\frac{1}{1-z}} - 1\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$  and  $\tanh^{-1}(\sqrt{z})$

01.12.27.1586.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = i \tanh^{-1}(\sqrt{z}) + \frac{\pi}{2}; 0 < \arg(z) \leq \pi$$

01.12.27.1587.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \frac{\pi}{2} - i \tanh^{-1}(\sqrt{z}); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1588.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = i \tanh^{-1}(\sqrt{z}) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1589.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \sqrt{\frac{1}{1-z}} \sqrt{1-z} \left(\frac{\pi}{2} - \frac{\sqrt{-z^2}}{z} \tanh^{-1}(\sqrt{z})\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$  and  $\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1590.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right); -\pi < \arg(z) < 0$$

01.12.27.1591.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right); 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1592.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \pi - i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right); (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1593.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \frac{\sqrt{1-z}}{\sqrt{-z}} \sqrt{\frac{z}{1-z}} \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2} \left(\sqrt{-z} \sqrt{-\frac{1}{z}} - \sqrt{\frac{1}{1-z}} \sqrt{1-z}\right)$$



Involving  $\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$  and  $\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1594.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1595.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1596.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \pi - i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right); (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1597.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \frac{z}{\sqrt{-z}} \sqrt{\frac{1-z}{z}} \sqrt{\frac{1}{1-z}} \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2} \left( \sqrt{-z} \sqrt{-\frac{1}{z}} - \sqrt{\frac{1}{1-z}} \sqrt{1-z} \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-a}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-a}}\right)$  and  $\tanh^{-1}\left(\sqrt{\frac{z}{a}}\right)$

01.12.27.1598.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = -i \tanh^{-1}(\sqrt{z}); 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0219.02

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = i \tanh^{-1}(\sqrt{z}); -\pi < \arg(z) < 0$$

01.12.27.1599.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \pi - i \tanh^{-1}(\sqrt{z}); (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0220.02

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{1}{2} \left( 1 - \sqrt{1-z} \sqrt{\frac{1}{1-z}} \right) \pi - \sqrt{-\frac{1}{z}} \sqrt{z} \tanh^{-1}(\sqrt{z})$$

01.12.27.0223.02

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-a}}\right) = \frac{1}{2} \left( 1 - \sqrt{a-z} \sqrt{\frac{1}{a-z}} \right) \pi - \sqrt{-\frac{1}{z}} \sqrt{z} \tanh^{-1}\left(\sqrt{\frac{z}{a}}\right); a > 0$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$  and  $\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0221.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi}{2} - i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right); \operatorname{Im}(z) \geq 0$$

01.12.27.1600.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) < 0$$

01.12.27.0222.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi}{2} - \sqrt{-\frac{1}{z}} \sqrt{z} \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$  and  $\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1601.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi}{2} - i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right); 0 \leq \arg(z) < \pi$$

01.12.27.1602.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi}{2} + i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1603.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi}{2} - z \sqrt{-\frac{1}{z^2}} \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$  and  $\tanh^{-1}(\sqrt{z})$

01.12.27.1604.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = i \tanh^{-1}(\sqrt{z}); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1605.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = -i \tanh^{-1}(\sqrt{z}); 0 < \arg(z) \leq \pi$$

01.12.27.1606.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \pi - i \tanh^{-1}(\sqrt{z}) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1607.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \sqrt{\frac{1}{1-z}} \sqrt{1-z} \left(\frac{\sqrt{-z}}{\sqrt{z}} \tanh^{-1}(\sqrt{z}) - \frac{\pi}{2}\right) + \frac{\pi}{2}$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$  and  $\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1608.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \frac{\pi}{2} - i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \text{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1609.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2} /; \text{Im}(z) < 0$$

01.12.27.1610.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1611.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \frac{\sqrt{-z^2} \sqrt{1-z}}{z} \sqrt{\frac{1}{1-z}} \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2} \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}}$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$  and  $\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1612.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \frac{\pi}{2} - i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \text{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1613.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2} /; \text{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1614.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1615.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \sqrt{\frac{1-z}{z}} \sqrt{\frac{1}{1-z}} \sqrt{-z} \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2} \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}}$$

### Involving $\sin^{-1}\left(\sqrt{\frac{z}{z-a}}\right)$

#### Involving $\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$ and $\tanh^{-1}(\sqrt{z})$

01.12.27.0215.02

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = i \tanh^{-1}(\sqrt{z}) /; \operatorname{Im}(z) < 0 \vee 0 < z < 1$$

01.12.27.1616.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = -i \tanh^{-1}(\sqrt{z}) /; 0 < \arg(z) \leq \pi$$

01.12.27.1617.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \pi - i \tanh^{-1}(\sqrt{z}) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0216.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \sqrt{\frac{1}{1-z}} \sqrt{1-z} \left( \frac{\sqrt{-z}}{\sqrt{z}} \tanh^{-1}(\sqrt{z}) - \frac{\pi}{2} \right) + \frac{\pi}{2}$$

#### Involving $\sin^{-1}\left(\sqrt{\frac{z}{z-a}}\right)$ and $\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0217.02

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \frac{\pi}{2} - i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; 0 < \arg(z) \leq \pi \vee z > 1$$

01.12.27.1618.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2} /; \operatorname{Im}(z) < 0$$

01.12.27.1619.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = i \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0218.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \frac{\sqrt{-z^2} \sqrt{1-z}}{z} \sqrt{\frac{1}{1-z}} \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2} \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}}$$

01.12.27.1620.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-a}}\right) = \frac{\sqrt{z-a}}{2\sqrt{z}} \sqrt{\frac{z}{z-a}} \left( \frac{1}{z} \sqrt{1-\frac{z}{a}} \sqrt{\frac{a}{a-z}} \left( 2a \sqrt{-\frac{z^2}{a^2}} \tanh^{-1}\left(\sqrt{\frac{z}{a}}\right) - \pi z \right) + \pi \right) /; a > 0$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$  and  $\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1621.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = -i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1622.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1623.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = i \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1624.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \sqrt{\frac{1}{1-z}} \sqrt{\frac{1-z}{z}} \sqrt{-z} \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{1}{2} \sqrt{\frac{z}{z-1}} \pi \sqrt{\frac{z-1}{z}}$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$  and  $\tanh^{-1}(z)$

01.12.27.0227.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \frac{\pi}{2} - i \tanh^{-1}(z); -\pi < \arg(z) \leq 0$$

01.12.27.1625.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \frac{\pi}{2} + i \tanh^{-1}(z); 0 < \arg(z) \leq \pi$$

01.12.27.0228.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \frac{\pi}{2} - \frac{\sqrt{-z^2}}{z} \tanh^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$  and  $\tanh^{-1}\left(\frac{1}{z}\right)$

01.12.27.0224.02

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = i \tanh^{-1}\left(\frac{1}{z}\right); \operatorname{Im}(z) > 0 \vee z < -1$$

01.12.27.1626.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -i \tanh^{-1}\left(\frac{1}{z}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1627.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = i \tanh^{-1}\left(\frac{1}{z}\right) + \pi; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1628.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -i \tanh^{-1}\left(\frac{1}{z}\right) + \pi; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0225.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -\frac{\sqrt{-z^2}}{z} \tanh^{-1}\left(\frac{1}{z}\right); z \notin (-1, 1)$$

01.12.27.0226.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -\frac{\sqrt{-z^2}}{z} \tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \left( \frac{\sqrt{-z-1}}{\sqrt{z+1}} + \frac{\sqrt{z-1}}{\sqrt{1-z}} \right)$$

## Involving $\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$

### Involving $\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$ and $\tanh^{-1}(z)$

01.12.27.1629.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = i \tanh^{-1}(z) + \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1630.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = \frac{\pi}{2} - i \tanh^{-1}(z); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1631.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = i \tanh^{-1}(z) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1632.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -i \tanh^{-1}(z) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1633.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = \sqrt{\frac{1}{1-z^2}} \sqrt{1-z^2} \left(\frac{\pi}{2} - \frac{\sqrt{-z^2}}{z} \tanh^{-1}(z)\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$  and  $\tanh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1634.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = i \tanh^{-1}\left(\frac{1}{z}\right); \text{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1635.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -i \tanh^{-1}\left(\frac{1}{z}\right); \text{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1636.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = i \tanh^{-1}\left(\frac{1}{z}\right) + \pi; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1637.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -i \tanh^{-1}\left(\frac{1}{z}\right) + \pi; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1638.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -\frac{\sqrt{-z^2}}{z} \tanh^{-1}\left(\frac{1}{z}\right); \text{Im}(z) \neq 0$$

01.12.27.1639.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -\sqrt{\frac{1}{1-z^2}} \sqrt{1-z^2} \left(\frac{\sqrt{-z^2}}{z} \tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} \left(\frac{\sqrt{-z-1}}{\sqrt{z+1}} + \frac{\sqrt{z-1}}{\sqrt{1-z}}\right)\right)$$

Involving  $\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$

Involving  $\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$  and  $\tanh^{-1}(z)$

01.12.27.0231.02

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -i \tanh^{-1}(z) /; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee -1 < z < 1$$

01.12.27.1640.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = i \tanh^{-1}(z) /; \frac{\pi}{2} < \arg(z) < \pi \vee -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1641.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \pi - i \tanh^{-1}(z) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1642.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\pi - i \tanh^{-1}(z) /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0232.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\sqrt{z^2-1} \sqrt{\frac{1}{1-z^2}} \tanh^{-1}(z) /; z \notin (-\infty, -1) \wedge z \notin (1, \infty)$$

01.12.27.0233.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\pi}{2} \left( \sqrt{\frac{1}{z+1}} \sqrt{z+1} - \sqrt{\frac{1}{1-z}} \sqrt{1-z} \right) - \sqrt{\frac{1}{1-z^2}} \sqrt{z^2-1} \tanh^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$  and  $\tanh^{-1}\left(\frac{1}{z}\right)$

01.12.27.0229.02

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\pi}{2} - i \tanh^{-1}\left(\frac{1}{z}\right) /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1643.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\pi}{2} + i \tanh^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1644.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = i \tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) < \pi$$

01.12.27.1645.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -i \tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$



01.12.27.0230.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\pi\sqrt{z^2}}{2z} - \sqrt{\frac{1}{1-z^2}} \sqrt{z^2-1} \tanh^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$  and  $\tanh^{-1}(z)$

01.12.27.1646.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = -i \tanh^{-1}(z) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1647.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = i \tanh^{-1}(z) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1648.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \pi - i \tanh^{-1}(z) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1649.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \pi + i \tanh^{-1}(z) /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1650.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{1}{2}\pi \left(2 - \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1}\right) - z \sqrt{-\frac{1}{z^2}} \tanh^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$  and  $\tanh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1651.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{\pi}{2} + i \tanh^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1652.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = -i \tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} /; 0 \leq \arg(z) < \pi$$

01.12.27.1653.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{\pi}{2} - z \sqrt{-\frac{1}{z^2}} \tanh^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$  and  $\tanh^{-1}(z)$

01.12.27.1654.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = i \tanh^{-1}(z) ; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1655.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = -i \tanh^{-1}(z) ; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1656.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \pi - i \tanh^{-1}(z) ; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1657.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = i \tanh^{-1}(z) + \pi ; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1658.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\sqrt{-z^2} \sqrt{z^2-1}}{\sqrt{z^2(1-z^2)}} \left( \frac{\pi}{2} \left( -\sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} + 2 \right) - \sqrt{-\frac{1}{z^2}} z \tanh^{-1}(z) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$  and  $\tanh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1659.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = i \tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} ; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1660.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\pi}{2} - i \tanh^{-1}\left(\frac{1}{z}\right) ; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1661.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = -i \tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1662.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = i \tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1663.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\sqrt{-z^2} \sqrt{z^2-1}}{\sqrt{z^2(1-z^2)}} \left( \frac{\pi}{2} - \sqrt{-\frac{1}{z^2}} z \tanh^{-1}\left(\frac{1}{z}\right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$  and  $\tanh^{-1}(z)$

01.12.27.1664.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = i \tanh^{-1}(z) /; \text{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1665.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = -i \tanh^{-1}(z) /; \text{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1666.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \pi - i \tanh^{-1}(z) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1667.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = i \tanh^{-1}(z) + \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1668.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \frac{\sqrt{-z^2} \sqrt{-1+z^2}}{\sqrt{z^2-z^4}} \left( \frac{1}{2} \pi \left( 2 - \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right) - z \sqrt{-\frac{1}{z^2}} \tanh^{-1}(z) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$  and  $\tanh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1669.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = i \tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1670.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \frac{\pi}{2} - i \tanh^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1671.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = -i \tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1672.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = i \tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1673.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \frac{\sqrt{-z^2} \sqrt{z^2-1}}{\sqrt{z^2(1-z^2)}} \left( \frac{\pi}{2} - \sqrt{-\frac{1}{z^2}} z \tanh^{-1}\left(\frac{1}{z}\right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{\sqrt{2}(1-z^2)^{1/4}}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{\sqrt{2}(1-z^2)^{1/4}}}\right)$  and  $\tanh^{-1}(z)$

01.12.27.1674.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2} \sqrt[4]{1-z^2}}\right) = \frac{1}{2} i \tanh^{-1}(z) /; -\pi < \arg(z) \leq 0$$

$$\text{01.12.27.0234.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}(1-z^2)^{1/4}} \right) = -\frac{i}{2} \tanh^{-1}(z) ; 0 < \arg(z) \leq \pi$$

$$\text{01.12.27.0235.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}(1-z^2)^{1/4}} \right) = \frac{\sqrt{-z^2}}{2z} \tanh^{-1}(z)$$

Involving  $\sin^{-1} \left( \frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}(1-z^2)^{1/4}} \right)$  and  $\tanh^{-1}\left(\frac{1}{z}\right)$

$$\text{01.12.27.1675.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}} \right) = \frac{\pi}{4} - \frac{1}{2} i \tanh^{-1}\left(\frac{1}{z}\right) ; \text{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

$$\text{01.12.27.1676.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}} \right) = \frac{1}{2} i \tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{4} ; \text{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

$$\text{01.12.27.1677.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}} \right) = -\frac{\pi}{4} - \frac{1}{2} i \tanh^{-1}\left(\frac{1}{z}\right) ; (z \in \mathbb{R} \wedge -1 < z < 0)$$

$$\text{01.12.27.1678.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}} \right) = \frac{1}{2} i \tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{4} ; (z \in \mathbb{R} \wedge 0 < z < 1)$$

$$\text{01.12.27.1679.01} \\ \sin^{-1} \left( \frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}} \right) = \frac{\sqrt{-z^2}}{2z} \tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi \sqrt{-z^2} \sqrt{z^2-1}}{4 \sqrt{z^2-z^4}}$$

Involving  $\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}(z^2-1)^{1/4}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}(z^2-1)^{1/4}}\right)$  and  $\tanh^{-1}(z)$

01.12.27.1680.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\sqrt[4]{z^2-1}}\right) = \frac{1}{2}i \tanh^{-1}(z) + \frac{\pi}{4} /; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.1681.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\sqrt[4]{z^2-1}}\right) = \frac{\pi}{4} - \frac{1}{2}i \tanh^{-1}(z) /; \frac{\pi}{2} < \arg(z) < \pi \vee -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1682.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\sqrt[4]{z^2-1}}\right) = \frac{1}{2}i \tanh^{-1}(z) - \frac{\pi}{4} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1683.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\sqrt[4]{z^2-1}}\right) = \frac{1}{2}i \tanh^{-1}(z) + \frac{3\pi}{4} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1684.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\sqrt[4]{z^2-1}}\right) = \frac{\pi}{4} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{z+1} \sqrt{\frac{1}{z+1} + 1} \right) + \frac{1}{2} \sqrt{z^2} \sqrt{-\frac{1}{z^2}} \tanh^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}(z^2-1)^{1/4}}\right)$  and  $\tanh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1685.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2 - 1} - z}}{\sqrt{2} \sqrt[4]{z^2 - 1}} \right) = \frac{i}{2} \tanh^{-1} \left( \frac{1}{z} \right) /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1686.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2 - 1} - z}}{\sqrt{2} \sqrt[4]{z^2 - 1}} \right) = -\frac{i}{2} \tanh^{-1} \left( \frac{1}{z} \right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1687.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2 - 1} - z}}{\sqrt{2} \sqrt[4]{z^2 - 1}} \right) = \frac{\pi}{2} - \frac{i}{2} \tanh^{-1} \left( \frac{1}{z} \right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.12.27.1688.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2 - 1} - z}}{\sqrt{2} \sqrt[4]{z^2 - 1}} \right) = \frac{i}{2} \tanh^{-1} \left( \frac{1}{z} \right) + \frac{\pi}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1689.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2 - 1} - z}}{\sqrt{2} \sqrt[4]{z^2 - 1}} \right) = \frac{\pi}{4} \left( 1 - \frac{\sqrt{z^2}}{z} \right) + \frac{1}{2} \sqrt{z^2} \sqrt{-\frac{1}{z^2}} \tanh^{-1} \left( \frac{1}{z} \right)$$

Involving  $\sin^{-1} \left( \sqrt{\frac{\sqrt{1 - z^2} - 1}{2\sqrt{1 - z^2}}} \right)$

Involving  $\sin^{-1} \left( \sqrt{\frac{\sqrt{1 - z^2} - 1}{2\sqrt{1 - z^2}}} \right)$  and  $\tanh^{-1}(z)$

01.12.27.1690.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{1 - z^2} - 1}{2\sqrt{1 - z^2}}} \right) = \frac{1}{2} i \tanh^{-1}(z) /; -\pi < \arg(z) \leq 0$$

01.12.27.0236.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) = -\frac{i}{2} \tanh^{-1}(z); 0 < \arg(z) \leq \pi$$

01.12.27.0237.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) = \frac{\sqrt{-z^2}}{2z} \tanh^{-1}(z)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right)$  and  $\tanh^{-1}\left(\frac{1}{z}\right)$

01.12.27.1691.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) = \frac{\pi}{4} - \frac{1}{2} i \tanh^{-1}\left(\frac{1}{z}\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1692.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) = \frac{1}{2} i \tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{4}; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1693.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) = -\frac{\pi}{4} - \frac{1}{2} i \tanh^{-1}\left(\frac{1}{z}\right); (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1694.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) = \frac{1}{2} i \tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{4}; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1695.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) = \frac{\sqrt{-z^2}}{2z} \tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi \sqrt{-z^2} \sqrt{z^2-1}}{4 \sqrt{z^2-z^4}}$$

Involving  $\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right)$  and  $\tanh^{-1}(z)$



01.12.27.1696.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{z^2 - 1} - z}{2\sqrt{z^2 - 1}}} \right) = \frac{1}{2} i \tanh^{-1}(z) + \frac{\pi}{4} /; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.1697.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{z^2 - 1} - z}{2\sqrt{z^2 - 1}}} \right) = \frac{\pi}{4} - \frac{1}{2} i \tanh^{-1}(z) /; \frac{\pi}{2} < \arg(z) < \pi \vee -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1698.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{z^2 - 1} - z}{2\sqrt{z^2 - 1}}} \right) = \frac{1}{2} i \tanh^{-1}(z) - \frac{\pi}{4} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1699.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{z^2 - 1} - z}{2\sqrt{z^2 - 1}}} \right) = \frac{1}{2} i \tanh^{-1}(z) + \frac{3\pi}{4} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1700.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{z^2 - 1} - z}{2\sqrt{z^2 - 1}}} \right) = \frac{\pi}{4} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{z+1} \sqrt{\frac{1}{z+1} + 1} \right) + \frac{1}{2} \sqrt{z^2} \sqrt{-\frac{1}{z^2}} \tanh^{-1}(z)$$

Involving  $\sin^{-1} \left( \sqrt{\left( \sqrt{z^2 - 1} - z \right) / \left( 2\sqrt{z^2 - 1} \right)} \right)$  and  $\tanh^{-1} \left( \frac{1}{z} \right)$

01.12.27.1701.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{z^2 - 1} - z}{2\sqrt{z^2 - 1}}} \right) = \frac{i}{2} \tanh^{-1} \left( \frac{1}{z} \right) /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1702.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{z^2 - 1} - z}{2\sqrt{z^2 - 1}}} \right) = -\frac{i}{2} \tanh^{-1} \left( \frac{1}{z} \right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1703.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{z^2 - 1} - z}{2\sqrt{z^2 - 1}}} \right) = \frac{\pi}{2} - \frac{i}{2} \tanh^{-1} \left( \frac{1}{z} \right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.12.27.1704.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) = \frac{i}{2} \tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1705.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) = \frac{\pi}{4} \left(1 - \frac{\sqrt{z^2}}{z}\right) + \frac{1}{2} \sqrt{z^2} \sqrt{-\frac{1}{z^2}} \tanh^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(\frac{az^c}{\sqrt{a^2z^{2c}-1}}\right)$

### Involving $\sin^{-1}\left(\frac{az^c}{\sqrt{a^2z^{2c}-1}}\right)$ and $\tanh^{-1}(az^c)$

01.12.27.1706.01

$$\sin^{-1}\left(\frac{az^c}{\sqrt{a^2z^{2c}-1}}\right) = \frac{\pi}{2} \left(\sqrt{\frac{1}{az^c+1}} \sqrt{az^c+1} - \sqrt{\frac{1}{1-az^c}} \sqrt{1-az^c}\right) - \sqrt{\frac{1}{1-a^2z^{2c}}} \sqrt{a^2z^{2c}-1} \tanh^{-1}(az^c)$$

### Involving $\coth^{-1}$

### Involving $\sin^{-1}(z)$

### Involving $\sin^{-1}(z)$ and $\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$

01.12.27.1707.01

$$\sin^{-1}(z) = i \coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) + \frac{\pi}{2} /; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge 0 < z < 1) \bigvee \arg(z) = -\frac{\pi}{2}$$

01.12.27.1708.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1709.01

$$\sin^{-1}(z) = -\frac{\pi}{2} - i \coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1710.01

$$\sin^{-1}(z) = i \coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) - \frac{\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge -1 < z < 0) \bigvee \arg(z) = \frac{\pi}{2}$$

01.12.27.1711.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2 - 1}}{\sqrt{1 - z^2}} \coth^{-1}\left(\frac{z}{\sqrt{z^2 - 1}}\right) + \frac{\pi z}{2} \sqrt{\frac{1}{z^2}}$$

Involving  $\sin^{-1}(z)$  and  $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2 - 1}}\right)$

01.12.27.1712.01

$$\sin^{-1}(z) = i \coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2 - 1}}\right) + \frac{\pi}{2} /; 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1713.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2 - 1}}\right) /; -\frac{\pi}{2} \leq \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1714.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + i \coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2 - 1}}\right) /; \frac{\pi}{2} \leq \arg(z) < \pi \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1715.01

$$\sin^{-1}(z) = -i \coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2 - 1}}\right) - \frac{\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1716.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2} \sqrt{z^2 - 1}}{z \sqrt{1 - z^2}} \coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2 - 1}}\right) + \frac{\pi z}{2} \sqrt{\frac{1}{z^2}}$$

Involving  $\sin^{-1}(z)$  and  $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1 - z^2}}\right)$

01.12.27.1717.01

$$\sin^{-1}(z) = i \coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1 - z^2}}\right) + \frac{\pi}{2} /; 0 < \arg(z) < \frac{\pi}{2}$$

01.12.27.1718.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1 - z^2}}\right) /; -\frac{\pi}{2} \leq \arg(z) \leq 0$$

01.12.27.1719.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + i \coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1 - z^2}}\right) /; \frac{\pi}{2} \leq \arg(z) \leq \pi$$

01.12.27.1720.01

$$\sin^{-1}(z) = -i \coth^{-1} \left( \frac{\sqrt{-z^2}}{\sqrt{1-z^2}} \right) - \frac{\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.1721.01

$$\sin^{-1}(z) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2}} - \frac{\sqrt{-z^2}}{z} \coth^{-1} \left( \frac{\sqrt{-z^2}}{\sqrt{1-z^2}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\coth^{-1} \left( \sqrt{\frac{z^2}{z^2-1}} \right)$

01.12.27.1722.01

$$\sin^{-1}(z) = i \coth^{-1} \left( \sqrt{\frac{z^2}{z^2-1}} \right) + \frac{\pi}{2} /; 0 < \arg(z) < \frac{\pi}{2}$$

01.12.27.1723.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \coth^{-1} \left( \sqrt{\frac{z^2}{z^2-1}} \right) /; -\frac{\pi}{2} \leq \arg(z) \leq 0$$

01.12.27.1724.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + i \coth^{-1} \left( \sqrt{\frac{z^2}{z^2-1}} \right) /; \frac{\pi}{2} \leq \arg(z) \leq \pi$$

01.12.27.1725.01

$$\sin^{-1}(z) = -i \coth^{-1} \left( \sqrt{\frac{z^2}{z^2-1}} \right) - \frac{\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.1726.01

$$\sin^{-1}(z) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2}} - \frac{\sqrt{-z}}{\sqrt{z}} \coth^{-1} \left( \sqrt{\frac{z^2}{z^2-1}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\coth^{-1} \left( \frac{\sqrt{z^2-1}}{z} \right)$

01.12.27.0239.02

$$\sin^{-1}(z) = i \coth^{-1} \left( \frac{\sqrt{z^2-1}}{z} \right) /; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee -1 < z < 1$$

01.12.27.1727.01

$$\sin^{-1}(z) = -i \operatorname{coth}^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \vee -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1728.01

$$\sin^{-1}(z) = -i \operatorname{coth}^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1729.01

$$\sin^{-1}(z) = \pi - i \operatorname{coth}^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0240.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2-1}}{\sqrt{1-z^2}} \operatorname{coth}^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) - \frac{\pi}{2\sqrt{1-z^2}} \left( (1-z) \sqrt{\frac{1+z}{1-z}} - (1+z) \sqrt{\frac{1-z}{1+z}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{coth}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$

01.12.27.1730.01

$$\sin^{-1}(z) = i \operatorname{coth}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1731.01

$$\sin^{-1}(z) = -i \operatorname{coth}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1732.01

$$\sin^{-1}(z) = \pi - i \operatorname{coth}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1733.01

$$\sin^{-1}(z) = i \operatorname{coth}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1734.01

$$\sin^{-1}(z) = -\frac{\pi}{2} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right) - \frac{\sqrt{z^2-z^4}}{z\sqrt{z^2-1}} \operatorname{coth}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{coth}^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$

01.12.27.1735.01

$$\sin^{-1}(z) = i \coth^{-1} \left( \frac{\sqrt{1-z^2}}{\sqrt{-z^2}} \right) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1736.01

$$\sin^{-1}(z) = -i \coth^{-1} \left( \frac{\sqrt{1-z^2}}{\sqrt{-z^2}} \right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1737.01

$$\sin^{-1}(z) = \pi - i \coth^{-1} \left( \frac{\sqrt{1-z^2}}{\sqrt{-z^2}} \right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1738.01

$$\sin^{-1}(z) = i \coth^{-1} \left( \frac{\sqrt{1-z^2}}{\sqrt{-z^2}} \right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1739.01

$$\sin^{-1}(z) = -\frac{\pi}{2} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right) - \frac{\sqrt{-z^2}}{z} \coth^{-1} \left( \frac{\sqrt{1-z^2}}{\sqrt{-z^2}} \right)$$

Involving  $\sin^{-1}(z)$  and  $\coth^{-1} \left( \sqrt{\frac{z^2-1}{z^2}} \right)$

01.12.27.1740.01

$$\sin^{-1}(z) = i \coth^{-1} \left( \sqrt{\frac{z^2-1}{z^2}} \right) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1741.01

$$\sin^{-1}(z) = -i \coth^{-1} \left( \sqrt{\frac{z^2-1}{z^2}} \right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1742.01

$$\sin^{-1}(z) = \pi - i \coth^{-1} \left( \sqrt{\frac{z^2-1}{z^2}} \right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1743.01

$$\sin^{-1}(z) = i \coth^{-1} \left( \sqrt{\frac{z^2-1}{z^2}} \right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1744.01

$$\sin^{-1}(z) = \frac{z\sqrt{z^2-1}}{\sqrt{z^2-z^4}} \coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) - \frac{\pi}{2} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} \right)$$

Involving  $\sin^{-1}(z)$  and  $\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right)$

01.12.27.1745.01

$$\sin^{-1}(z) = \frac{\pi}{4} - \frac{1}{2} i \coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) /; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge 0 < z < 1) \bigvee (i z \in \mathbb{R} \wedge i z > 0)$$

01.12.27.1746.01

$$\sin^{-1}(z) = \frac{\pi}{4} + \frac{1}{2} i \coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1747.01

$$\sin^{-1}(z) = -\frac{\pi}{4} + \frac{1}{2} i \coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.12.27.1748.01

$$\sin^{-1}(z) = -\frac{\pi}{4} - \frac{1}{2} i \coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge -1 < z < 0) \bigvee (i z \in \mathbb{R} \wedge i z < 0)$$

01.12.27.1749.01

$$\sin^{-1}(z) = -\frac{3\pi}{4} + \frac{i}{2} \coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1750.01

$$\sin^{-1}(z) = \frac{3\pi}{4} + \frac{i}{2} \coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1751.01

$$\sin^{-1}(z) = \frac{\pi}{4} \left( -\sqrt{\frac{1}{1-z}} \sqrt{1-z} + \sqrt{\frac{1}{z+1}} \sqrt{z+1} - \sqrt{-iz} \sqrt{\frac{i}{z}} + \sqrt{-\frac{i}{z}} \sqrt{iz} + \frac{\sqrt{z^2}}{z} \right) - \frac{\sqrt{z^2-1}}{2\sqrt{1-z^2}} \coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right)$$

Involving  $\sin^{-1}(z)$  and  $\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right)$

01.12.27.0241.02

$$\sin^{-1}(z) = \frac{\sqrt{-z^4}}{2z^2} \coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right); \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4}$$

01.12.27.1752.01

$$\begin{aligned} \sin^{-1}(z) = & \frac{1}{4}\pi \left( \frac{\sqrt{z^2-1}z}{\sqrt{z^4-z^2}} + \sqrt{\frac{1}{z}} \sqrt{\frac{1}{\sqrt{2}z-1}} \sqrt{\sqrt{2}z-1} \sqrt{z} - \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{-\sqrt{2}z-1} \sqrt{-\frac{1}{\sqrt{2}z+1}} + \frac{\sqrt{z^2}}{z} \right) + \\ & \frac{\sqrt{1-z^2}}{2\sqrt{z^2-1}} \coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) \end{aligned}$$

Involving  $\sin^{-1}(z)$  and  $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right)$

01.12.27.1753.01

$$\sin^{-1}(z) = 2i \coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < 1)$$

01.12.27.1754.01

$$\sin^{-1}(z) = -2i \coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) < 0$$

01.12.27.1755.01

$$\sin^{-1}(z) = \frac{3\pi}{2} - 2i \coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right); (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1756.01

$$\sin^{-1}(z) = -\frac{2\sqrt{1-z}}{\sqrt{z-1}} \coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) + \frac{\pi\sqrt{z-1}\sqrt{z}}{\sqrt{1-z}} \sqrt{-\frac{1}{z}} + \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right)$

01.12.27.1757.01

$$\sin^{-1}(z) = 2i \coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1758.01

$$\sin^{-1}(z) = -2i \coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.1759.01

$$\sin^{-1}(z) = \frac{3\pi}{2} - 2i \coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right); (z \in \mathbb{R} \wedge z > 1)$$



01.12.27.1760.01

$$\sin^{-1}(z) = \pi \left( \frac{\sqrt{z-1} \sqrt{z}}{\sqrt{1-z}} \sqrt{-\frac{1}{z} + \frac{1}{2}} + \frac{2\sqrt{z+1}}{\sqrt{-z-1}} \coth^{-1} \left( \frac{\sqrt{1-z}}{\sqrt{-z-1}} \right) \right)$$

Involving  $\sin^{-1}(z)$  and  $\coth^{-1} \left( \sqrt{\frac{z-1}{z+1}} \right)$

01.12.27.1761.01

$$\sin^{-1}(z) = 2i \coth^{-1} \left( \sqrt{\frac{z-1}{z+1}} \right) - \frac{\pi}{2} /; 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1762.01

$$\sin^{-1}(z) = -2i \coth^{-1} \left( \sqrt{\frac{z-1}{z+1}} \right) - \frac{\pi}{2} /; \operatorname{Im}(z) < 0$$

01.12.27.1763.01

$$\sin^{-1}(z) = \frac{3\pi}{2} - 2i \coth^{-1} \left( \sqrt{\frac{z-1}{z+1}} \right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1764.01

$$\sin^{-1}(z) = 2 \sqrt{\frac{z}{1-z}} \sqrt{1-z} \sqrt{-\frac{1}{z}} \coth^{-1} \left( \sqrt{\frac{z-1}{z+1}} \right) + \frac{\pi \sqrt{z-1} \sqrt{z}}{\sqrt{1-z}} \sqrt{-\frac{1}{z} + \frac{\pi}{2}}$$

Involving  $\sin^{-1}(z)$  and  $\coth^{-1} \left( \frac{\sqrt{z+1}}{\sqrt{z-1}} \right)$

01.12.27.1765.01

$$\sin^{-1}(z) = 2i \coth^{-1} \left( \frac{\sqrt{z+1}}{\sqrt{z-1}} \right) + \frac{\pi}{2} /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.1766.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2i \coth^{-1} \left( \frac{\sqrt{z+1}}{\sqrt{z-1}} \right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1767.01

$$\sin^{-1}(z) = 2i \coth^{-1} \left( \frac{\sqrt{z+1}}{\sqrt{z-1}} \right) - \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1768.01

$$\sin^{-1}(z) = \frac{2\sqrt{z-1}}{\sqrt{1-z}} \coth^{-1} \left( \frac{\sqrt{z+1}}{\sqrt{z-1}} \right) - \frac{\pi \sqrt{-z-1} \sqrt{-z}}{\sqrt{z+1}} \sqrt{\frac{1}{z} - \frac{\pi}{2}}$$

Involving  $\sin^{-1}(z)$  and  $\coth^{-1} \left( \frac{\sqrt{-1-z}}{\sqrt{1-z}} \right)$

01.12.27.1769.01

$$\sin^{-1}(z) = 2i \operatorname{coth}^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) + \frac{\pi}{2} /; \operatorname{Im}(z) > 0$$

01.12.27.1770.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2i \operatorname{coth}^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) /; -\pi < \arg(z) \leq 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1771.01

$$\sin^{-1}(z) = 2i \operatorname{coth}^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) - \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1772.01

$$\sin^{-1}(z) = \frac{2\sqrt{z+1}}{\sqrt{-z-1}} \operatorname{coth}^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{1-z}}\right) - \pi \left(\frac{\sqrt{-z-1}\sqrt{-z}}{\sqrt{z+1}} \sqrt{\frac{1}{z} + \frac{1}{2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{coth}^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right)$

01.12.27.1773.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2i \operatorname{coth}^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) /; -\pi < \arg(z) \leq 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1774.01

$$\sin^{-1}(z) = 2i \operatorname{coth}^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) + \frac{\pi}{2} /; \operatorname{Im}(z) > 0$$

01.12.27.1775.01

$$\sin^{-1}(z) = 2i \operatorname{coth}^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) - \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1776.01

$$\sin^{-1}(z) = -2\sqrt{\frac{1}{z}} \sqrt{-\frac{z}{z+1}} \sqrt{z+1} \operatorname{coth}^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) - \frac{\pi}{2} - \frac{\pi\sqrt{-z-1}\sqrt{-z}}{\sqrt{z+1}} \sqrt{\frac{1}{z}}$$

Involving  $\sin^{-1}\left(\frac{2z}{z^2+1}\right)$

Involving  $\sin^{-1}\left(\frac{2z}{z^2+1}\right)$  and  $\operatorname{coth}^{-1}(iz)$

01.12.27.1777.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \pi - 2i \operatorname{coth}^{-1}(iz) /; |z| < 1 \wedge -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.1778.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = -2i \operatorname{coth}^{-1}(iz) - \pi /; |z| < 1 \wedge \left(\frac{\pi}{2} \leq \arg(z) \leq \pi \vee -\pi < \arg(z) < -\frac{\pi}{2}\right)$$

01.12.27.1779.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \pi z \sqrt{\frac{1}{z^2}} - 2i \coth^{-1}(iz) ; |z| < 1$$

01.12.27.1780.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = 2i \coth^{-1}(iz) ; |z| > 1$$

01.12.27.1781.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \frac{\pi z}{2} \sqrt{\frac{1}{z^2} \left( \frac{1-z}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2} + 1 \right)} - \frac{2i(1-z)}{z+1} \sqrt{\left(\frac{z+1}{z-1}\right)^2} \coth^{-1}(iz)$$

Involving  $\sin^{-1}\left(\frac{2z}{z^2+1}\right)$  and  $\coth^{-1}\left(\frac{i}{z}\right)$

01.12.27.1782.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = 2i \coth^{-1}\left(\frac{i}{z}\right) ; |z| < 1$$

01.12.27.1783.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \pi - 2i \coth^{-1}\left(\frac{i}{z}\right) ; |z| > 1 \wedge -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1784.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = -2i \coth^{-1}\left(\frac{i}{z}\right) - \pi ; |z| > 1 \wedge \left(\frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}\right)$$

01.12.27.1785.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \frac{\pi \sqrt{z^2}}{z} - 2i \coth^{-1}\left(\frac{i}{z}\right) ; |z| > 1$$

01.12.27.1786.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = \frac{\pi \sqrt{z^2}}{2z} \left( 1 - \frac{1-z}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2} \right) + \frac{2i(1-z)}{1+z} \sqrt{\left(\frac{z+1}{z-1}\right)^2} \coth^{-1}\left(\frac{i}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{2z}{z^2+1}\right)$  and  $\coth^{-1}(iz^r)$

01.12.27.1787.01

$$\sin^{-1}\left(\frac{2z}{z^2+1}\right) = 2i \coth^{-1}\left(iz \frac{\sqrt{\left(\frac{z+1}{z-1}\right)^2}}{z+1}\right)$$

Involving  $\sin^{-1}\left(\frac{1-z}{1+z}\right)$

Involving  $\sin^{-1}\left(\frac{1-z}{1+z}\right)$  and  $\coth^{-1}(\sqrt{-z})$

01.12.27.1788.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = -2i \coth^{-1}(\sqrt{-z}) - \frac{\pi}{2} /; \operatorname{Im}(z) > 0$$

01.12.27.1789.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = 2i \coth^{-1}(\sqrt{-z}) - \frac{\pi}{2} /; -\pi < \arg(z) \leq 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1790.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{3\pi}{2} - 2i \coth^{-1}(\sqrt{-z}) /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1791.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{1}{2}\pi \left( 2\sqrt{\frac{1}{1+z}} \sqrt{1+z} - 2\sqrt{\frac{1}{z}} \sqrt{z-1} \right) + \frac{2\sqrt{-(1+z)z}}{\sqrt{z}} \sqrt{\frac{1}{1+z}} \coth^{-1}(\sqrt{-z})$$

Involving  $\sin^{-1}\left(\frac{1-z}{1+z}\right)$  and  $\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right)$

01.12.27.1792.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = -2i \coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) + \frac{\pi}{2} /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1793.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{\pi}{2} + 2i \coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) /; -\pi < \arg(z) \leq 0$$

01.12.27.1794.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = 2i \coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) - \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1795.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \pi \left( \sqrt{1+z} \sqrt{\frac{1}{1+z}} - \frac{1}{2} \right) + \frac{2\sqrt{-(1+z)z}}{\sqrt{z}} \sqrt{\frac{1}{1+z}} \coth^{-1}\left(\frac{1}{\sqrt{-z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1-z}{1+z}\right)$  and  $\coth^{-1}\left(\sqrt{-\frac{1}{z}}\right)$

01.12.27.1796.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = -2i \coth^{-1}\left(\sqrt{-\frac{1}{z}}\right) + \frac{\pi}{2} /; 0 \leq \arg(z) < \pi \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1797.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \frac{\pi}{2} + 2i \coth^{-1}\left(\sqrt{-\frac{1}{z}}\right) /; -\pi < \arg(z) < 0$$

01.12.27.1798.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = 2i \operatorname{coth}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1799.01

$$\sin^{-1}\left(\frac{1-z}{1+z}\right) = \left(\sqrt{z+1} \sqrt{\frac{1}{z+1}} - \frac{1}{2}\right)\pi - 2\sqrt{z} \sqrt{\frac{1}{z+1}} \sqrt{-\frac{z+1}{z}} \operatorname{coth}^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

### Involving $\sin^{-1}\left(\frac{z-1}{z+1}\right)$

#### Involving $\sin^{-1}\left(\frac{z-1}{z+1}\right)$ and $\operatorname{coth}^{-1}(\sqrt{-z})$

01.12.27.1800.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = 2i \operatorname{coth}^{-1}(\sqrt{-z}) + \frac{\pi}{2}; \operatorname{Im}(z) > 0$$

01.12.27.1801.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -2i \operatorname{coth}^{-1}(\sqrt{-z}) + \frac{\pi}{2}; -\pi < \arg(z) \leq 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1802.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\frac{3\pi}{2} + 2i \operatorname{coth}^{-1}(\sqrt{-z}); (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1803.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = \frac{1}{2}\pi \left(-2\sqrt{\frac{1}{1+z}} \sqrt{1+z} + 2\sqrt{\frac{1}{z}} \sqrt{z} + 1\right) - \frac{2\sqrt{-(1+z)z}}{\sqrt{z}} \sqrt{\frac{1}{1+z}} \operatorname{coth}^{-1}(\sqrt{-z})$$

#### Involving $\sin^{-1}\left(\frac{z-1}{z+1}\right)$ and $\operatorname{coth}^{-1}\left(\frac{1}{\sqrt{-z}}\right)$

01.12.27.1804.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = 2i \operatorname{coth}^{-1}\left(\frac{1}{\sqrt{-z}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1805.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\frac{\pi}{2} - 2i \operatorname{coth}^{-1}\left(\frac{1}{\sqrt{-z}}\right); -\pi < \arg(z) \leq 0$$

01.12.27.1806.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -2i \operatorname{coth}^{-1}\left(\frac{1}{\sqrt{-z}}\right) + \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1807.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\pi \left(\sqrt{1+z} \sqrt{\frac{1}{1+z}} - \frac{1}{2}\right) - \frac{2\sqrt{-(1+z)z}}{\sqrt{z}} \sqrt{\frac{1}{1+z}} \operatorname{coth}^{-1}\left(\frac{1}{\sqrt{-z}}\right)$$

Involving  $\sin^{-1}\left(\frac{z-1}{z+1}\right)$  and  $\coth^{-1}\left(\sqrt{-\frac{1}{z}}\right)$

01.12.27.1808.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = 2i \coth^{-1}\left(\sqrt{-\frac{1}{z}}\right) - \frac{\pi}{2}; 0 \leq \arg(z) < \pi \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1809.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\frac{\pi}{2} - 2i \coth^{-1}\left(\sqrt{-\frac{1}{z}}\right); -\pi < \arg(z) < 0$$

01.12.27.1810.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -2i \coth^{-1}\left(\sqrt{-\frac{1}{z}}\right) + \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1811.01

$$\sin^{-1}\left(\frac{z-1}{z+1}\right) = -\left(\sqrt{z+1} \sqrt{\frac{1}{z+1}} - \frac{1}{2}\right)\pi + 2\sqrt{z} \sqrt{\frac{1}{z+1}} \sqrt{-\frac{z+1}{z}} \coth^{-1}\left(\sqrt{-\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1+z}{1-z}\right)$

Involving  $\sin^{-1}\left(\frac{1+z}{1-z}\right)$  and  $\coth^{-1}(\sqrt{z})$

01.12.27.1812.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = 2i \coth^{-1}(\sqrt{z}) - \frac{\pi}{2}; 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1813.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = -2i \coth^{-1}(\sqrt{z}) - \frac{\pi}{2}; \operatorname{Im}(z) < 0$$

01.12.27.1814.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = \frac{3\pi}{2} - 2i \coth^{-1}(\sqrt{z}); (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1815.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \frac{1}{2}\pi \left(2\sqrt{\frac{1}{1-z}} \sqrt{1-z} - 2\sqrt{-\frac{1}{z}} \sqrt{-z} - 1\right) + \frac{2\sqrt{(1-z)z}}{\sqrt{-z}} \sqrt{\frac{1}{1-z}} \coth^{-1}(\sqrt{z})$$

Involving  $\sin^{-1}\left(\frac{1+z}{1-z}\right)$  and  $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1816.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = 2i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2}; 0 < \arg(z) \leq \pi$$

01.12.27.1817.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = \frac{\pi}{2} - 2i \operatorname{coth}^{-1}\left(\sqrt{\frac{1}{z}}\right); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1818.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = 2i \operatorname{coth}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1819.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \pi \left( \sqrt{1-z} \sqrt{\frac{1}{1-z}} - \frac{1}{2} \right) + \frac{2\sqrt{(1-z)z}}{\sqrt{-z}} \sqrt{\frac{1}{1-z}} \operatorname{coth}^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1+z}{1-z}\right)$  and  $\operatorname{coth}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1820.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = 2i \operatorname{coth}^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) > 0$$

01.12.27.1821.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = \frac{\pi}{2} - 2i \operatorname{coth}^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 1)$$

01.12.27.1822.01

$$\sin^{-1}\left(\frac{z+1}{1-z}\right) = 2i \operatorname{coth}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1823.01

$$\sin^{-1}\left(\frac{1+z}{1-z}\right) = \pi \left( \sqrt{1-z} \sqrt{\frac{1}{1-z}} - \frac{1}{2} \right) - 2\sqrt{\frac{1-z}{z}} \sqrt{\frac{1}{1-z}} \sqrt{-z} \operatorname{coth}^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{z+1}{z-1}\right)$

Involving  $\sin^{-1}\left(\frac{z+1}{z-1}\right)$  and  $\operatorname{coth}^{-1}(\sqrt{z})$

01.12.27.1824.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2i \operatorname{coth}^{-1}(\sqrt{z}) + \frac{\pi}{2}; 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1825.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = 2i \operatorname{coth}^{-1}(\sqrt{z}) + \frac{\pi}{2}; \operatorname{Im}(z) < 0$$

01.12.27.1826.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{3\pi}{2} + 2i \operatorname{coth}^{-1}(\sqrt{z}); (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1827.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{1}{2}\pi\left(2\sqrt{\frac{1}{1-z}}\sqrt{1-z} - 2\sqrt{-\frac{1}{z}}\sqrt{-z} - 1\right) - \frac{2\sqrt{(1-z)z}}{\sqrt{-z}}\sqrt{\frac{1}{1-z}}\coth^{-1}(\sqrt{z})$$

Involving  $\sin^{-1}\left(\frac{z+1}{z-1}\right)$  and  $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1828.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2i\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2}; 0 < \arg(z) \leq \pi$$

01.12.27.1829.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{\pi}{2} + 2i\coth^{-1}\left(\frac{1}{\sqrt{z}}\right); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1830.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2i\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1831.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\pi\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - \frac{1}{2}\right) - \frac{2\sqrt{(1-z)z}}{\sqrt{-z}}\sqrt{\frac{1}{1-z}}\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{z+1}{z-1}\right)$  and  $\coth^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1832.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2i\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) > 0$$

01.12.27.1833.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\frac{\pi}{2} + 2i\coth^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 1)$$

01.12.27.1834.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -2i\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{3\pi}{2}; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1835.01

$$\sin^{-1}\left(\frac{z+1}{z-1}\right) = -\pi\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - \frac{1}{2}\right) + 2\sqrt{\frac{1-z}{z}}\sqrt{\frac{1}{1-z}}\sqrt{-z}\coth^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\frac{1-z^2}{1+z^2}\right)$

Involving  $\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right)$  and  $\coth^{-1}(z)$



01.12.27.1836.01

$$\sin^{-1}\left(\frac{z^2+1}{1-z^2}\right) = 2i \coth^{-1}(z) - \frac{\pi}{2} /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1837.01

$$\sin^{-1}\left(\frac{z^2+1}{1-z^2}\right) = -2i \coth^{-1}(z) - \frac{\pi}{2} /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1838.01

$$\sin^{-1}\left(\frac{z^2+1}{1-z^2}\right) = \frac{3\pi}{2} - 2i \coth^{-1}(z) /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1839.01

$$\sin^{-1}\left(\frac{z^2+1}{1-z^2}\right) = \frac{3\pi}{2} + 2i \coth^{-1}(z) /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1840.01

$$\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right) = \frac{1}{2}\pi \left(1 - 2\sqrt{\frac{1}{z^2}}\sqrt{z^2}\sqrt{z^2-1}\sqrt{\frac{1}{z^2-1}}\right) - \frac{2\sqrt{-z^2}}{z}\sqrt{\frac{1-z}{z+1}}\sqrt{\frac{z+1}{1-z}}\coth^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right)$  and  $\coth^{-1}\left(\frac{1}{z}\right)$

01.12.27.0242.02

$$\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right) = 2i \coth^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} /; \operatorname{Im}(z) > 0 \vee -1 < z < 0$$

01.12.27.1841.01

$$\sin^{-1}\left(\frac{z^2+1}{1-z^2}\right) = \frac{\pi}{2} - 2i \coth^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1842.01

$$\sin^{-1}\left(\frac{z^2+1}{1-z^2}\right) = 2i \coth^{-1}\left(\frac{1}{z}\right) - \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1843.01

$$\sin^{-1}\left(\frac{z^2+1}{1-z^2}\right) = -2i \coth^{-1}\left(\frac{1}{z}\right) - \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0243.01

$$\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right) = \frac{\pi}{2} - \frac{2\sqrt{-z^2}}{z}\coth^{-1}\left(\frac{1}{z}\right) /; z \notin (-\infty, -1) \wedge z \notin (1, \infty)$$

01.12.27.1844.01

$$\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right) = \frac{\pi}{2} \left(2\sqrt{\frac{1}{1-z^2}}\sqrt{1-z^2}-1\right) - \frac{2\sqrt{-z^2}}{z}\sqrt{\frac{1-z}{z+1}}\sqrt{\frac{z+1}{1-z}}\coth^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right)$

Involving  $\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right)$  and  $\coth^{-1}(z)$

01.12.27.1845.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -2i \coth^{-1}(z) + \frac{\pi}{2} /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1846.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = 2i \coth^{-1}(z) + \frac{\pi}{2} /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1847.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -\frac{3\pi}{2} + 2i \coth^{-1}(z) /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1848.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -\frac{3\pi}{2} - 2i \coth^{-1}(z) /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1849.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -\frac{1}{2}\pi \left(1 - 2\sqrt{\frac{1}{z^2}} \sqrt{z^2-1} \sqrt{\frac{1}{z^2-1}}\right) + \frac{2\sqrt{-z^2}}{z} \sqrt{\frac{1-z}{z+1}} \sqrt{\frac{z+1}{1-z}} \coth^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right)$  and  $\coth^{-1}\left(\frac{1}{z}\right)$

01.12.27.1850.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -2i \coth^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1851.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -\frac{\pi}{2} + 2i \coth^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1852.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -2i \coth^{-1}\left(\frac{1}{z}\right) + \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1853.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = 2i \coth^{-1}\left(\frac{1}{z}\right) + \frac{3\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1854.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -\frac{\pi}{2} + \frac{2\sqrt{-z^2}}{z} \coth^{-1}\left(\frac{1}{z}\right) /; z \notin (-\infty, -1) \wedge z \notin (1, \infty)$$

01.12.27.1855.01

$$\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) = -\frac{\pi}{2} \left(2\sqrt{\frac{1}{1-z^2}} \sqrt{1-z^2} - 1\right) + \frac{2\sqrt{-z^2}}{z} \sqrt{\frac{1-z}{z+1}} \sqrt{\frac{z+1}{1-z}} \coth^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$ and $\coth^{-1}(\sqrt{z})$

01.12.27.1856.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -i \coth^{-1}(\sqrt{z}) /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1857.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = i \coth^{-1}(\sqrt{z}) /; 0 < \arg(z) \leq \pi$$

01.12.27.1858.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \pi - i \coth^{-1}(\sqrt{z}) /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1859.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\sqrt{z}}{\sqrt{-z}} \coth^{-1}(\sqrt{z}) - \frac{1}{2} \left( \sqrt{-z} \sqrt{-\frac{1}{z}} \sqrt{1-z} \sqrt{\frac{1}{1-z}} - 1 \right) \pi$$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$ and $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1860.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2} /; 0 < \arg(z) \leq \pi$$

01.12.27.0244.02

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\pi}{2} - i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) \leq 0$$

01.12.27.0245.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\pi}{2} - \frac{\sqrt{-z^2}}{z} \coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$ and $\coth^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1861.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = i \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2} /; \operatorname{Im}(z) > 0$$

01.12.27.1862.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -i \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2} /; \operatorname{Im}(z) \leq 0$$

01.12.27.1863.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\pi}{2} - \sqrt{\frac{1}{z}} \sqrt{-z} \coth^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$  and  $\coth^{-1}(\sqrt{z})$

01.12.27.1864.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -i \coth^{-1}(\sqrt{z}) /; \operatorname{Im}(z) < 0$$

01.12.27.1865.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = i \coth^{-1}(\sqrt{z}) /; 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1866.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \pi - i \coth^{-1}(\sqrt{z}) /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1867.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \frac{\sqrt{1-z}}{\sqrt{-z}} \sqrt{\frac{z}{1-z}} \coth^{-1}(\sqrt{z}) - \frac{\pi}{2} \left( \sqrt{-z} \sqrt{-\frac{1}{z}} - \sqrt{1-z} \sqrt{\frac{1}{1-z}} \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$  and  $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1868.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2} /; 0 < \arg(z) \leq \pi$$

01.12.27.1869.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \frac{\pi}{2} - i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1870.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1871.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \sqrt{\frac{1}{1-z}} \sqrt{1-z} \left( \frac{\pi}{2} - \frac{\sqrt{-z^2}}{z} \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$  and  $\coth^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1872.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = i \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) > 0$$

01.12.27.1873.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \frac{\pi}{2} - i \coth^{-1}\left(\sqrt{\frac{1}{z}}\right); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z < 1)$$

01.12.27.1874.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = i \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1875.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \sqrt{\frac{1}{1-z}} \sqrt{1-z} \left( \frac{\pi}{2} - \sqrt{\frac{1}{z}} \sqrt{-z} \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$  and  $\coth^{-1}(\sqrt{z})$

01.12.27.0252.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi}{2} - i \coth^{-1}(\sqrt{z}); \operatorname{Im}(z) \geq 0$$

01.12.27.1876.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = i \coth^{-1}(\sqrt{z}) + \frac{\pi}{2}; \operatorname{Im}(z) < 0$$

01.12.27.0253.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi}{2} - \sqrt{-\frac{1}{z}} \sqrt{z} \coth^{-1}(\sqrt{z})$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$  and  $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1877.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = -i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right); 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0250.02

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) < 0$$

01.12.27.1878.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \pi - i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0251.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\sqrt{(1-z)z}}{\sqrt{z-1}\sqrt{-z}} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} \left( \frac{\sqrt{-z}}{\sqrt{z}} \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2} \right) + \frac{\pi}{2} \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$  and  $\coth^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1879.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = -i \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1880.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = i \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1881.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \pi - i \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1882.01

$$\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\sqrt{(1-z)z}}{\sqrt{z-1}\sqrt{-z}} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} \left( \sqrt{-z} \sqrt{\frac{1}{z}} \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2} \right) + \frac{\pi}{2} \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$  and  $\coth^{-1}(\sqrt{z})$

01.12.27.1883.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \frac{\pi}{2} - i \coth^{-1}(\sqrt{z}) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1884.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = i \coth^{-1}(\sqrt{z}) + \frac{\pi}{2} /; \operatorname{Im}(z) < 0$$

01.12.27.1885.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = i \coth^{-1}(\sqrt{z}) - \frac{\pi}{2} ; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1886.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \frac{\sqrt{-z^2} \sqrt{1-z}}{z} \sqrt{\frac{1}{1-z}} \coth^{-1}(\sqrt{z}) + \frac{\pi}{2} \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}}$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$  and  $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1887.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) ; \text{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1888.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = -i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) ; 0 < \arg(z) \leq \pi$$

01.12.27.1889.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \pi - i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) ; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1890.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \sqrt{\frac{1}{1-z}} \sqrt{1-z} \left( \frac{\sqrt{-z}}{\sqrt{z}} \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2} \right) + \frac{\pi}{2}$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$  and  $\coth^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1891.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = i \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) ; \text{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 1)$$

01.12.27.1892.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = -i \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) ; 0 < \arg(z) < \pi$$

01.12.27.1893.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \pi - i \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) ; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1894.01

$$\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \sqrt{\frac{1}{1-z}} \sqrt{1-z} \left( \sqrt{-z} \sqrt{\frac{1}{z}} \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2} \right) + \frac{\pi}{2}$$

### Involving $\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$  and  $\coth^{-1}(\sqrt{z})$

01.12.27.0248.02

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \frac{\pi}{2} - i \coth^{-1}(\sqrt{z}) ; 0 < \arg(z) \leq \pi \vee z > 1$$

01.12.27.1895.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = i \coth^{-1}(\sqrt{z}) + \frac{\pi}{2} ; \operatorname{Im}(z) < 0$$

01.12.27.1896.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = i \coth^{-1}(\sqrt{z}) - \frac{\pi}{2} ; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0249.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \frac{\sqrt{-z^2} \sqrt{1-z}}{z} \sqrt{\frac{1}{1-z}} \coth^{-1}(\sqrt{z}) + \frac{\pi}{2} \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}}$$

### Involving $\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$ and $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.1897.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) ; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0246.02

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = -i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) ; 0 < \arg(z) \leq \pi$$

01.12.27.1898.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \pi - i \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) ; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0247.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \sqrt{\frac{1}{1-z}} \sqrt{1-z} \left( \frac{\sqrt{-z}}{\sqrt{z}} \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2} \right) + \frac{\pi}{2}$$

### Involving $\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$ and $\coth^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.1899.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = -i \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) ; \operatorname{Im}(z) > 0$$



01.12.27.1900.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = i \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) ; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 1)$$

01.12.27.1901.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \pi - i \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) ; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1902.01

$$\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \sqrt{\frac{1}{1-z}} \sqrt{1-z} \left( \sqrt{-z} \sqrt{\frac{1}{z}} \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2} \right) + \frac{\pi}{2}$$

### Involving $\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$ and $\coth^{-1}(z)$

01.12.27.0254.02

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = i \coth^{-1}(z) ; \operatorname{Im}(z) > 0 \vee z < -1$$

01.12.27.1903.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -i \coth^{-1}(z) ; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1904.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = i \coth^{-1}(z) + \pi ; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1905.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -i \coth^{-1}(z) + \pi ; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.0255.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -\frac{\sqrt{-z^2}}{z} \coth^{-1}(z) ; z \notin (-1, 1)$$

01.12.27.0256.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -\frac{\sqrt{-z^2}}{z} \coth^{-1}(z) - \frac{\pi i}{2} \left( \frac{\sqrt{-z-1}}{\sqrt{z+1}} + \frac{\sqrt{z-1}}{\sqrt{1-z}} \right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$  and  $\coth^{-1}\left(\frac{1}{z}\right)$

01.12.27.0257.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \frac{\pi}{2} - i \coth^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) \leq 0$$

01.12.27.1906.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \frac{\pi}{2} + i \coth^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) \leq \pi$$

01.12.27.0258.01

$$\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \frac{\pi}{2} - \frac{\sqrt{-z^2}}{z} \coth^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$  and  $\coth^{-1}(z)$

01.12.27.1907.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = i \coth^{-1}(z) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1908.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -i \coth^{-1}(z) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1909.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = i \coth^{-1}(z) + \pi /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1910.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -i \coth^{-1}(z) + \pi /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1911.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -\frac{\sqrt{-z^2} \coth^{-1}(z)}{z} /; \operatorname{Im}(z) \neq 0$$

01.12.27.1912.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -\sqrt{\frac{1}{1-z^2}} \sqrt{1-z^2} \left( \frac{\pi i}{2} \left( \frac{\sqrt{-z-1}}{\sqrt{z+1}} + \frac{\sqrt{z-1}}{\sqrt{1-z}} \right) + \frac{\sqrt{-z^2} \coth^{-1}(z)}{z} \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$  and  $\coth^{-1}\left(\frac{1}{z}\right)$

01.12.27.1913.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = \frac{\pi}{2} - i \coth^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1914.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = \frac{\pi}{2} + i \coth^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1915.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = i \coth^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1916.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -i \coth^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1917.01

$$\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = \sqrt{\frac{1}{1-z^2}} \sqrt{1-z^2} \left( \frac{\pi}{2} - \frac{\sqrt{-z^2}}{z} \coth^{-1}\left(\frac{1}{z}\right) \right)$$

Involving  $\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$

Involving  $\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$  and  $\coth^{-1}(z)$

01.12.27.0259.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\pi}{2} - i \coth^{-1}(z) /; 0 < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1918.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\pi}{2} + i \coth^{-1}(z) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1919.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = i \coth^{-1}(z) - \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) < \pi$$

01.12.27.1920.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -i \coth^{-1}(z) - \frac{\pi}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0260.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\pi \sqrt{z^2}}{2z} - \sqrt{\frac{1}{1-z^2}} \sqrt{z^2-1} \coth^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$  and  $\coth^{-1}\left(\frac{1}{z}\right)$

01.12.27.0261.02

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -i \coth^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee -1 < z < 1$$

01.12.27.1921.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = i \coth^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \vee -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1922.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \pi - i \coth^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1923.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\pi - i \coth^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.0262.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\sqrt{z^2-1} \sqrt{\frac{1}{1-z^2}} \coth^{-1}\left(\frac{1}{z}\right) /; z \notin (-\infty, -1) \wedge z \notin (1, \infty)$$

01.12.27.0263.01

$$\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\pi}{2} \left( \sqrt{\frac{1}{z+1}} \sqrt{z+1} - \sqrt{\frac{1}{1-z}} \sqrt{1-z} \right) - \sqrt{\frac{1}{1-z^2}} \sqrt{z^2-1} \coth^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$  and  $\coth^{-1}(z)$

01.12.27.1924.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{\pi}{2} + i \coth^{-1}(z) \ ; \ -\pi < \arg(z) < 0 \ \vee \ (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1925.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = -i \coth^{-1}(z) + \frac{\pi}{2} \ ; \ 0 \leq \arg(z) < \pi$$

01.12.27.1926.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{\pi}{2} - \sqrt{-\frac{1}{z^2}} z \coth^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$  and  $\coth^{-1}\left(\frac{1}{z}\right)$

01.12.27.1927.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = -i \coth^{-1}\left(\frac{1}{z}\right) \ ; \ \operatorname{Im}(z) > 0 \ \vee \ (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1928.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = i \coth^{-1}\left(\frac{1}{z}\right) \ ; \ \operatorname{Im}(z) < 0 \ \vee \ (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1929.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \pi - i \coth^{-1}\left(\frac{1}{z}\right) \ ; \ (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1930.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \pi + i \coth^{-1}\left(\frac{1}{z}\right) \ ; \ (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1931.01

$$\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{1}{2} \pi \left( -\sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} + 2 \right) - \sqrt{-\frac{1}{z^2}} z \coth^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$  and  $\coth^{-1}(z)$

01.12.27.1932.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = i \coth^{-1}(z) + \frac{\pi}{2} /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1933.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\pi}{2} - i \coth^{-1}(z) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1934.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = -i \coth^{-1}(z) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1935.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = i \coth^{-1}(z) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1936.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\sqrt{-z^2} \sqrt{z^2-1}}{\sqrt{z^2(1-z^2)}} \left( \frac{\pi}{2} - \sqrt{-\frac{1}{z^2}} z \coth^{-1}(z) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$  and  $\coth^{-1}\left(\frac{1}{z}\right)$

01.12.27.1937.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = i \coth^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1938.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = -i \coth^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1939.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \pi - i \coth^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1940.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = i \coth^{-1}\left(\frac{1}{z}\right) + \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1941.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\sqrt{-z^2} \sqrt{z^2-1}}{\sqrt{z^2(1-z^2)}} \left( \frac{\pi}{2} \left( -\sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} + 2 \right) - \sqrt{-\frac{1}{z^2}} z \coth^{-1}\left(\frac{1}{z}\right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$  and  $\coth^{-1}(z)$

01.12.27.1942.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = i \coth^{-1}(z) + \frac{\pi}{2} /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1943.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \frac{\pi}{2} - i \coth^{-1}(z) /; \text{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1944.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = -i \coth^{-1}(z) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1945.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = i \coth^{-1}(z) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1946.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \frac{\sqrt{-z^2} \sqrt{z^2-1}}{\sqrt{z^2(1-z^2)}} \left( \frac{\pi}{2} - \sqrt{-\frac{1}{z^2}} z \coth^{-1}(z) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$  and  $\coth^{-1}\left(\frac{1}{z}\right)$

01.12.27.1947.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = i \coth^{-1}\left(\frac{1}{z}\right) /; \text{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1948.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = -i \coth^{-1}\left(\frac{1}{z}\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1949.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \pi - i \coth^{-1}\left(\frac{1}{z}\right); (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1950.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = i \coth^{-1}\left(\frac{1}{z}\right) + \pi; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1951.01

$$\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \frac{\sqrt{-z^2} \sqrt{z^2-1}}{\sqrt{z^2(1-z^2)}} \left( \frac{\pi}{2} \left( -\sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{\frac{1}{z+1}} \sqrt{z+1} + 2 \right) - \sqrt{-\frac{1}{z^2}} z \coth^{-1}\left(\frac{1}{z}\right) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{(\sqrt{2}(1-z^2)^{1/4})}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{(\sqrt{2}(1-z^2)^{1/4})}}\right)$  and  $\coth^{-1}(z)$

01.12.27.1952.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2} \sqrt[4]{1-z^2}}\right) = \frac{\pi}{4} - \frac{1}{2} i \coth^{-1}(z); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1953.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2} \sqrt[4]{1-z^2}}\right) = \frac{1}{2} i \coth^{-1}(z) + \frac{\pi}{4}; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1954.01

$$\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2} \sqrt[4]{1-z^2}}\right) = -\frac{\pi}{4} - \frac{1}{2} i \coth^{-1}(z); (z \in \mathbb{R} \wedge -1 < z < 0)$$



01.12.27.1955.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}} \right) = \frac{1}{2} i \coth^{-1}(z) - \frac{\pi}{4}; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1956.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}} \right) = \frac{\sqrt{-z^2}}{2z} \coth^{-1}(z) + \frac{\pi \sqrt{-z^2} \sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving  $\sin^{-1} \left( \sqrt{\sqrt{1-z^2}-1} / (\sqrt{2}(1-z^2)^{1/4}) \right)$  and  $\coth^{-1}(\frac{1}{z})$

01.12.27.1957.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}} \right) = \frac{i}{2} \coth^{-1}\left(\frac{1}{z}\right); -\pi < \arg(z) \leq 0$$

01.12.27.0264.01

$$\sin^{-1} \left( \frac{1}{\sqrt{2}} \frac{\sqrt{\sqrt{1-z^2}-1}}{(1-z^2)^{1/4}} \right) = -\frac{i}{2} \coth^{-1}\left(\frac{1}{z}\right); 0 < \arg(z) \leq \pi$$

01.12.27.0265.01

$$\sin^{-1} \left( \frac{1}{\sqrt{2}} \frac{\sqrt{\sqrt{1-z^2}-1}}{(1-z^2)^{1/4}} \right) = \frac{\sqrt{-z^2}}{2z} \coth^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1} \left( \sqrt{\sqrt{z^2-1}-z} / (\sqrt{2}(z^2-1)^{1/4}) \right)$

Involving  $\sin^{-1} \left( \sqrt{\sqrt{z^2-1}-z} / (\sqrt{2}(z^2-1)^{1/4}) \right)$  and  $\coth^{-1}(z)$

01.12.27.1958.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2 - 1} - z}}{\sqrt{2} \sqrt[4]{z^2 - 1}} \right) = \frac{i}{2} \coth^{-1}(z) ; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1959.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2 - 1} - z}}{\sqrt{2} \sqrt[4]{z^2 - 1}} \right) = -\frac{i}{2} \coth^{-1}(z) ; -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1960.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2 - 1} - z}}{\sqrt{2} \sqrt[4]{z^2 - 1}} \right) = \frac{\pi}{2} - \frac{i}{2} \coth^{-1}(z) ; \frac{\pi}{2} < \arg(z) < \pi$$

01.12.27.1961.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2 - 1} - z}}{\sqrt{2} \sqrt[4]{z^2 - 1}} \right) = \frac{i}{2} \coth^{-1}(z) + \frac{\pi}{2} ; -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1962.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2 - 1} - z}}{\sqrt{2} \sqrt[4]{z^2 - 1}} \right) = \frac{\pi}{4} \left( 1 - \frac{\sqrt{z^2}}{z} \right) + \frac{1}{2} \sqrt{z^2} \sqrt{-\frac{1}{z^2}} \coth^{-1}(z)$$

Involving  $\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2 - 1} - z}}{(\sqrt{2} (z^2 - 1)^{1/4})} \right)$  and  $\coth^{-1}(\frac{1}{z})$

01.12.27.1963.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2 - 1} - z}}{\sqrt{2} \sqrt[4]{z^2 - 1}} \right) = \frac{1}{2} i \coth^{-1} \left( \frac{1}{z} \right) + \frac{\pi}{4} ; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.1964.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2 - 1} - z}}{\sqrt{2} \sqrt[4]{z^2 - 1}} \right) = \frac{\pi}{4} - \frac{1}{2} i \coth^{-1} \left( \frac{1}{z} \right) ; \frac{\pi}{2} < \arg(z) < \pi \vee -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1965.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\sqrt[4]{z^2-1}} \right) = \frac{1}{2} i \coth^{-1} \left( \frac{1}{z} \right) - \frac{\pi}{4} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1966.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\sqrt[4]{z^2-1}} \right) = \frac{1}{2} i \coth^{-1} \left( \frac{1}{z} \right) + \frac{3\pi}{4} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1967.01

$$\sin^{-1} \left( \frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\sqrt[4]{z^2-1}} \right) = \frac{\pi}{4} \left( \sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{z+1} \sqrt{\frac{1}{z+1} + 1} \right) + \frac{1}{2} \sqrt{z^2} \sqrt{-\frac{1}{z^2}} \coth^{-1} \left( \frac{1}{z} \right)$$

Involving  $\sin^{-1} \left( \sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}} \right)$

Involving  $\sin^{-1} \left( \sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}} \right)$  and  $\coth^{-1}(z)$

01.12.27.1968.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}} \right) = \frac{\pi}{4} - \frac{1}{2} i \coth^{-1}(z) /; \text{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1969.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}} \right) = \frac{1}{2} i \coth^{-1}(z) + \frac{\pi}{4} /; \text{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1970.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}} \right) = -\frac{\pi}{4} - \frac{1}{2} i \coth^{-1}(z) /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1971.01

$$\sin^{-1} \left( \sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}} \right) = \frac{1}{2} i \coth^{-1}(z) - \frac{\pi}{4} /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1972.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) = \frac{\sqrt{-z^2}}{2z} \coth^{-1}(z) + \frac{\pi\sqrt{-z^2}\sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving  $\sin^{-1}\left(\sqrt{\left(\sqrt{1-z^2}-1\right)/\left(2\sqrt{1-z^2}\right)}\right)$  and  $\coth^{-1}\left(\frac{1}{z}\right)$

01.12.27.1973.01

$$\sin^{-1}\left(\frac{1}{\sqrt{2}}\sqrt{\frac{\sqrt{1-z^2}-1}{\sqrt{1-z^2}}}\right) = \frac{i}{2} \coth^{-1}\left(\frac{1}{z}\right); -\pi < \arg(z) \leq 0$$

01.12.27.0266.01

$$\sin^{-1}\left(\frac{1}{\sqrt{2}}\sqrt{\frac{\sqrt{1-z^2}-1}{\sqrt{1-z^2}}}\right) = -\frac{i}{2} \coth^{-1}\left(\frac{1}{z}\right); 0 < \arg(z) \leq \pi$$

01.12.27.0267.01

$$\sin^{-1}\left(\frac{1}{\sqrt{2}}\sqrt{1-\frac{1}{\sqrt{1-z^2}}}\right) = \frac{\sqrt{-z^2}}{2z} \coth^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\left(\sqrt{z^2-1}-z\right)/\left(2\sqrt{z^2-1}\right)}\right)$

Involving  $\sin^{-1}\left(\sqrt{\left(\sqrt{z^2-1}-z\right)/\left(2\sqrt{z^2-1}\right)}\right)$  and  $\coth^{-1}(z)$

01.12.27.1974.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) = \frac{i}{2} \coth^{-1}(z); 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1975.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) = -\frac{i}{2} \coth^{-1}(z); -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1976.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) = \frac{\pi}{2} - \frac{i}{2} \coth^{-1}(z); \frac{\pi}{2} < \arg(z) < \pi$$

01.12.27.1977.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) = \frac{i}{2} \coth^{-1}(z) + \frac{\pi}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.1978.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) = \frac{\pi}{4} \left(1 - \frac{\sqrt{z^2}}{z}\right) + \frac{1}{2} \sqrt{z^2} \sqrt{-\frac{1}{z^2}} \coth^{-1}(z)$$

Involving  $\sin^{-1}\left(\sqrt{\left(\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}\right)}\right)$  and  $\coth^{-1}\left(\frac{1}{z}\right)$

01.12.27.1979.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) = \frac{1}{2} i \coth^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{4} /; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.1980.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) = \frac{\pi}{4} - \frac{1}{2} i \coth^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \vee -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.1981.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) = \frac{1}{2} i \coth^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{4} /; (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1982.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) = \frac{1}{2} i \coth^{-1}\left(\frac{1}{z}\right) + \frac{3\pi}{4} /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1983.01

$$\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) = \frac{\pi}{4} \left(\sqrt{\frac{1}{1-z}} \sqrt{1-z} - \sqrt{z+1} \sqrt{\frac{1}{z+1} + 1}\right) + \frac{1}{2} \sqrt{z^2} \sqrt{-\frac{1}{z^2}} \coth^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{az^c}{\sqrt{a^2 z^{2c}-1}}\right)$

Involving  $\sin^{-1}\left(\frac{az^c}{\sqrt{a^2 z^{2c}-1}}\right)$  and  $\coth^{-1}\left(\frac{1}{az^c}\right)$

01.12.27.0268.02

$$\sin^{-1}\left(\frac{az^c}{\sqrt{a^2z^{2c}-1}}\right) = \frac{\pi}{2}\left(\sqrt{\frac{1}{az^c+1}}\sqrt{az^c+1} - \sqrt{\frac{1}{1-az^c}}\sqrt{1-az^c}\right) - \sqrt{\frac{1}{1-a^2z^{2c}}}\sqrt{a^2z^{2c}-1}\coth^{-1}\left(\frac{1}{az^c}\right)$$

**Involving  $\operatorname{csch}^{-1}$**

**Involving  $\sin^{-1}(z)$**

Involving  $\sin^{-1}(z)$  and  $\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$

01.12.27.0269.01

$$\sin^{-1}(z) = i \operatorname{csch}^{-1}\left(\frac{i}{z}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csch}^{-1}\left(\frac{i}{1-2z^2}\right)$

01.12.27.1984.01

$$\sin^{-1}(z) = \frac{1}{2}\left(-i \operatorname{csch}^{-1}\left(\frac{i}{1-2z^2}\right) + \frac{\pi}{2}\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1985.01

$$\sin^{-1}(z) = \frac{1}{2}\left(i \operatorname{csch}^{-1}\left(\frac{i}{1-2z^2}\right) - \frac{\pi}{2}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.1986.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{2z}\left(-i \operatorname{csch}^{-1}\left(\frac{i}{1-2z^2}\right) + \frac{\pi}{2}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csch}^{-1}\left(\frac{i}{2z^2-1}\right)$

01.12.27.1987.01

$$\sin^{-1}(z) = \frac{1}{2}\left(i \operatorname{csch}^{-1}\left(\frac{i}{2z^2-1}\right) + \frac{\pi}{2}\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.1988.01

$$\sin^{-1}(z) = -\frac{1}{2}\left(i \operatorname{csch}^{-1}\left(\frac{i}{2z^2-1}\right) + \frac{\pi}{2}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.1989.01

$$\sin^{-1}(z) = \frac{\sqrt{z^2}}{2z}\left(i \operatorname{csch}^{-1}\left(\frac{i}{2z^2-1}\right) + \frac{\pi}{2}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csch}^{-1}\left(\frac{\sqrt{2}}{\sqrt{-z-1}}\right)$

01.12.27.1990.01

$$\sin^{-1}(z) = 2i \operatorname{csch}^{-1}\left(\frac{\sqrt{2}}{\sqrt{-z-1}}\right) - \frac{\pi}{2}; 0 < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.1991.01

$$\sin^{-1}(z) = -\frac{\pi}{2} - 2i \operatorname{csch}^{-1}\left(\frac{\sqrt{2}}{\sqrt{-z-1}}\right); -\pi < \arg(z) \leq 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.1992.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + \frac{2\sqrt{1+z}}{\sqrt{-z-1}} \operatorname{csch}^{-1}\left(\frac{\sqrt{2}}{\sqrt{-z-1}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csch}^{-1}\left(\sqrt{\frac{2}{-z-1}}\right)$

01.12.27.1993.01

$$\sin^{-1}(z) = -2i \operatorname{csch}^{-1}\left(\sqrt{\frac{2}{-z-1}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) < 0$$

01.12.27.1994.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + 2i \operatorname{csch}^{-1}\left(\sqrt{\frac{2}{-z-1}}\right); \operatorname{Im}(z) \geq 0$$

01.12.27.1995.01

$$\sin^{-1}(z) = -\frac{\pi}{2} + 2\sqrt{1+z} \sqrt{-\frac{1}{z+1}} \operatorname{csch}^{-1}\left(\sqrt{\frac{2}{-z-1}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csch}^{-1}\left(\frac{\sqrt{2}}{\sqrt{z-1}}\right)$

01.12.27.1996.01

$$\sin^{-1}(z) = 2i \operatorname{csch}^{-1}\left(\frac{\sqrt{2}}{\sqrt{z-1}}\right) + \frac{\pi}{2}; 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.1997.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2i \operatorname{csch}^{-1}\left(\frac{\sqrt{2}}{\sqrt{z-1}}\right); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.1998.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \frac{2\sqrt{1-z}}{\sqrt{z-1}} \operatorname{csch}^{-1}\left(\frac{\sqrt{2}}{\sqrt{z-1}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csch}^{-1}\left(\sqrt{\frac{2}{z-1}}\right)$

01.12.27.1999.01

$$\sin^{-1}(z) = 2i \operatorname{csch}^{-1}\left(\sqrt{\frac{2}{z-1}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) > 0$$

01.12.27.2000.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2i \operatorname{csch}^{-1}\left(\sqrt{\frac{2}{z-1}}\right); \operatorname{Im}(z) \leq 0$$

01.12.27.2001.01

$$\sin^{-1}(z) = \frac{\pi}{2} - 2\sqrt{1-z} \sqrt{\frac{1}{z-1}} \operatorname{csch}^{-1}\left(\sqrt{\frac{2}{z-1}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csch}^{-1}\left(\frac{1}{\sqrt{-z^2}}\right)$

01.12.27.2002.01

$$\sin^{-1}(z) = i \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{-z^2}}\right); 0 < \arg(z) \leq \pi$$

01.12.27.2003.01

$$\sin^{-1}(z) = -i \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{-z^2}}\right); -\pi < \arg(z) \leq 0$$

01.12.27.2004.01

$$\sin^{-1}(z) = -\frac{\sqrt{-z^2}}{z} \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{-z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csch}^{-1}\left(\sqrt{-\frac{1}{z^2}}\right)$

01.12.27.2005.01

$$\sin^{-1}(z) = i \operatorname{csch}^{-1}\left(\sqrt{-\frac{1}{z^2}}\right); 0 \leq \arg(z) < \pi$$

01.12.27.2006.01

$$\sin^{-1}(z) = -i \operatorname{csch}^{-1}\left(\sqrt{-\frac{1}{z^2}}\right); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2007.01

$$\sin^{-1}(z) = z \sqrt{-\frac{1}{z^2}} \operatorname{csch}^{-1}\left(\sqrt{-\frac{1}{z^2}}\right)$$



Involving  $\sin^{-1}(z)$  and  $\operatorname{csch}^{-1}\left(\frac{1}{\sqrt{-1+z^2}}\right)$

01.12.27.2008.01

$$\sin^{-1}(z) = i \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z^2-1}}\right) + \frac{\pi}{2} /; 0 < \arg(z) \leq \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2009.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z^2-1}}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2010.01

$$\sin^{-1}(z) = i \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z^2-1}}\right) - \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2011.01

$$\sin^{-1}(z) = -i \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z^2-1}}\right) - \frac{\pi}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.2012.01

$$\sin^{-1}(z) = \frac{\pi \sqrt{z^2}}{2z} - \frac{\sqrt{-z^2}}{z} \sqrt{\frac{z-1}{z+1}} \sqrt{\frac{z+1}{z-1}} \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z^2-1}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z^2-1}}\right)$

01.12.27.2013.01

$$\sin^{-1}(z) = i \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z^2-1}}\right) + \frac{\pi}{2} /; 0 < \arg(z) < \frac{\pi}{2}$$

01.12.27.2014.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z^2-1}}\right) /; -\frac{\pi}{2} < \arg(z) \leq 0 \vee (i z \in \mathbb{R} \wedge i z < 0)$$

01.12.27.2015.01

$$\sin^{-1}(z) = i \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z^2-1}}\right) - \frac{\pi}{2} /; \frac{\pi}{2} < \arg(z) \leq \pi \vee (i z \in \mathbb{R} \wedge i z > 0)$$

01.12.27.2016.01

$$\sin^{-1}(z) = -i \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z^2-1}}\right) - \frac{\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.12.27.2017.01

$$\sin^{-1}(z) = \frac{\pi \sqrt{z^2}}{2z} - \frac{\sqrt{-z-1} \sqrt{z-1} z}{\sqrt{z^2-1}} \sqrt{\frac{1}{z^2}} \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z^2-1}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{csch}^{-1}\left(\frac{1}{2z\sqrt{z^2-1}}\right)$

01.12.27.2018.01

$$\sin^{-1}(z) = \frac{\sqrt{-z^4}}{2z^2} \operatorname{csch}^{-1}\left(\frac{1}{2z\sqrt{z^2-1}}\right) /; \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4}$$

01.12.27.2019.01

$$\sin^{-1}(z) = \frac{1}{4}\pi \left( \frac{\sqrt{z^2}}{z} - \sqrt{\frac{1}{z}} \sqrt{z} \sqrt{\frac{1}{\sqrt{2}z+1}} \sqrt{\sqrt{2}z+1} + \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{\frac{1}{1-\sqrt{2}z}} \sqrt{1-\sqrt{2}z} + \frac{\sqrt{z^4-z^2}}{z\sqrt{z^2-1}} \right) + \frac{\sqrt{z^2(z^2-1)} \sqrt{2z^2-1}}{2z^2\sqrt{1-2z^2}} \sqrt{\frac{z^2}{z^2-1}} \operatorname{csch}^{-1}\left(\frac{1}{2z\sqrt{z^2-1}}\right)$$

Involving  $\sin^{-1}(iz)$

Involving  $\sin^{-1}(iz)$  and  $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.12.27.0270.01

$$\sin^{-1}(iz) = i \operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}(\sqrt{cz})$

Involving  $\sin^{-1}(\sqrt{z})$  and  $\operatorname{csch}^{-1}\left(\frac{1}{\sqrt{-z}}\right)$

01.12.27.2020.01

$$\sin^{-1}(\sqrt{z}) = i \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{-z}}\right) /; 0 < \arg(z) \leq \pi$$

01.12.27.2021.01

$$\sin^{-1}(\sqrt{z}) = -i \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{-z}}\right) /; -\pi < \arg(z) \leq 0$$

01.12.27.2022.01

$$\sin^{-1}(\sqrt{z}) = -\frac{\sqrt{-z^2}}{z} \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{-z}}\right)$$

Involving  $\sin^{-1}(\sqrt{z})$  and  $\operatorname{csch}^{-1}\left(\sqrt{-\frac{1}{z}}\right)$

01.12.27.2023.01

$$\sin^{-1}(\sqrt{z}) = i \operatorname{csch}^{-1}\left(\sqrt{-\frac{1}{z}}\right); \operatorname{Im}(z) \geq 0$$

01.12.27.2024.01

$$\sin^{-1}(\sqrt{z}) = -i \operatorname{csch}^{-1}\left(\sqrt{-\frac{1}{z}}\right); \operatorname{Im}(z) < 0$$

01.12.27.2025.01

$$\sin^{-1}(\sqrt{z}) = \sqrt{-\frac{1}{z}} \sqrt{z} \operatorname{csch}^{-1}\left(\sqrt{-\frac{1}{z}}\right)$$

Involving  $\sin^{-1}(\sqrt{-z})$  and  $\operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.2026.01

$$\sin^{-1}(\sqrt{-z}) = -i \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right); 0 < \arg(z) \leq \pi$$

01.12.27.0273.01

$$\sin^{-1}(\sqrt{-z}) = i \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right); -\pi < \arg(z) \leq 0$$

01.12.27.0274.01

$$\sin^{-1}(\sqrt{-z}) = \frac{\sqrt{-z^2}}{z} \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}(\sqrt{-z})$  and  $\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.2027.01

$$\sin^{-1}(\sqrt{-z}) = -i \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) > 0$$

01.12.27.2028.01

$$\sin^{-1}(\sqrt{-z}) = i \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) \leq 0$$

01.12.27.2029.01

$$\sin^{-1}(\sqrt{-z}) = \sqrt{\frac{1}{z}} \sqrt{-z} \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

### Involving $\sin^{-1}\left(\frac{1}{\sqrt{cz}}\right)$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$  and  $\operatorname{csch}^{-1}(\sqrt{-z})$

$$\text{01.12.27.2030.01} \\ \sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i \operatorname{csch}^{-1}(\sqrt{-z}) /; 0 < \arg(z) \leq \pi$$

$$\text{01.12.27.2031.01} \\ \sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = i \operatorname{csch}^{-1}(\sqrt{-z}) /; -\pi < \arg(z) \leq 0$$

$$\text{01.12.27.2032.01} \\ \sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{z} \operatorname{csch}^{-1}(\sqrt{-z})$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right)$  and  $\operatorname{csch}^{-1}(\sqrt{z})$

$$\text{01.12.27.2033.01} \\ \sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = i \operatorname{csch}^{-1}(\sqrt{z}) /; 0 < \arg(z) \leq \pi$$

$$\text{01.12.27.2034.01} \\ \sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -i \operatorname{csch}^{-1}(\sqrt{z}) /; -\pi < \arg(z) \leq 0$$

$$\text{01.12.27.2035.01} \\ \sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{\sqrt{z}}{\sqrt{-z}} \operatorname{csch}^{-1}(\sqrt{z})$$

### Involving $\sin^{-1}\left(\sqrt{cz^2}\right)$

Involving  $\sin^{-1}\left(\sqrt{z^2}\right)$  and  $\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$

$$\text{01.12.27.2036.01} \\ \sin^{-1}\left(\sqrt{z^2}\right) = i \operatorname{csch}^{-1}\left(\frac{i}{z}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

$$\text{01.12.27.2037.01} \\ \sin^{-1}\left(\sqrt{z^2}\right) = -i \operatorname{csch}^{-1}\left(\frac{i}{z}\right) /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.2038.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = \frac{i\sqrt{z^2}}{z} \operatorname{csch}^{-1}\left(\frac{i}{z}\right)$$

Involving  $\sin^{-1}\left(\sqrt{-z^2}\right)$  and  $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.12.27.0282.01

$$\sin^{-1}\left(\sqrt{-z^2}\right) = i \operatorname{csch}^{-1}\left(\frac{1}{z}\right); -\pi < \arg(z) \leq 0$$

01.12.27.2039.01

$$\sin^{-1}\left(\sqrt{-z^2}\right) = -i \operatorname{csch}^{-1}\left(\frac{1}{z}\right); 0 < \arg(z) \leq \pi$$

01.12.27.0283.01

$$\sin^{-1}\left(\sqrt{-z^2}\right) = \frac{\sqrt{-z^2}}{z} \operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(a(bz^c)^m\right)$

Involving  $\sin^{-1}\left(a(bz^c)^m\right)$  and  $\operatorname{csch}^{-1}\left(\frac{i}{a}b^{-m}z^{-mc}\right)$

01.12.27.2040.01

$$\sin^{-1}\left(a(bz^c)^m\right) = \frac{i(bz^c)^m}{b^m z^{mc}} \operatorname{csch}^{-1}\left(\frac{i}{a}b^{-m}z^{-mc}\right); 2m \in \mathbb{Z}$$

Involving  $\sin^{-1}(1 + 2z^2)$

Involving  $\sin^{-1}(1 + 2z^2)$  and  $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.12.27.0271.02

$$\sin^{-1}(1 + 2z^2) = \frac{\pi}{2} - 2i \operatorname{csch}^{-1}\left(\frac{1}{z}\right); -\pi < \arg(z) \leq 0$$

01.12.27.2041.01

$$\sin^{-1}(2z^2 + 1) = 2i \operatorname{csch}^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2}; 0 < \arg(z) \leq \pi$$

01.12.27.0272.01

$$\sin^{-1}(2z^2 + 1) = \frac{\pi}{2} - \frac{2\sqrt{-z^2}}{z} \operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{z^2+2}{z^2}\right)$

Involving  $\sin^{-1}\left(\frac{z^2+2}{z^2}\right)$  and  $\operatorname{csch}^{-1}(z)$

01.12.27.2042.01

$$\sin^{-1}\left(\frac{z^2+2}{z^2}\right) = \frac{\pi}{2} - 2i \operatorname{csch}^{-1}(z) \quad ; \quad 0 \leq \arg(z) < \pi$$

01.12.27.2043.01

$$\sin^{-1}\left(\frac{z^2+2}{z^2}\right) = 2i \operatorname{csch}^{-1}(z) + \frac{\pi}{2} \quad ; \quad \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2044.01

$$\sin^{-1}\left(\frac{z^2+2}{z^2}\right) = \frac{\pi}{2} - 2z \sqrt{-\frac{1}{z^2}} \operatorname{csch}^{-1}(z)$$

Involving  $\sin^{-1}(\sqrt{1+z})$

Involving  $\sin^{-1}(\sqrt{z+1})$  and  $\operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.0275.01

$$\sin^{-1}(\sqrt{z+1}) = \frac{\pi}{2} - i \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) \quad ; \quad -\pi < \arg(z) \leq 0$$

01.12.27.2045.01

$$\sin^{-1}(\sqrt{z+1}) = i \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi}{2} \quad ; \quad 0 < \arg(z) \leq \pi$$

01.12.27.0276.01

$$\sin^{-1}(\sqrt{1+z}) = \frac{\pi}{2} - \frac{\sqrt{-z^2}}{z} \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}(\sqrt{z+1})$  and  $\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.2046.01

$$\sin^{-1}(\sqrt{z+1}) = i \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2} \quad ; \quad \operatorname{Im}(z) > 0$$

01.12.27.2047.01

$$\sin^{-1}(\sqrt{z+1}) = -i \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2} \quad ; \quad \operatorname{Im}(z) \leq 0$$

01.12.27.2048.01

$$\sin^{-1}(\sqrt{z+1}) = \frac{\pi}{2} - \sqrt{\frac{1}{z}} \sqrt{-z} \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{1+cz}}{\sqrt{2}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{2}}\right)$  and  $\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$

01.12.27.2049.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{2}}\right) = \frac{1}{2}\left(\frac{\pi}{2} - i \operatorname{csch}^{-1}\left(\frac{i}{z}\right)\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{1+z}}{\sqrt{2}}\right)$  and  $\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$

01.12.27.2050.01

$$\sin^{-1}\left(\frac{\sqrt{1+z}}{\sqrt{2}}\right) = \frac{1}{2}\left(\frac{\pi}{2} + i \operatorname{csch}^{-1}\left(\frac{i}{z}\right)\right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{z+c}}{\sqrt{z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z+a}}{\sqrt{z}}\right)$  and  $\operatorname{csch}^{-1}\left(\sqrt{\frac{z}{a}}\right)$

01.12.27.0279.02

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\pi}{2} - i \operatorname{csch}^{-1}(\sqrt{z}) \quad ; 0 \leq \arg(z) < \pi \quad \vee \quad z < -1$$

01.12.27.2051.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = i \operatorname{csch}^{-1}(\sqrt{z}) + \frac{\pi}{2} \quad ; \operatorname{Im}(z) < 0$$

01.12.27.2052.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = i \operatorname{csch}^{-1}(\sqrt{z}) - \frac{\pi}{2} \quad ; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.0280.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\sqrt{-z} \sqrt{z+1}}{\sqrt{-z-1} \sqrt{z}} \left( \frac{\pi}{2} - \sqrt{-\frac{1}{z}} \sqrt{z} \operatorname{csch}^{-1}(\sqrt{z}) \right)$$

01.12.27.2053.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\pi}{2} \sqrt{\frac{z}{z+1}} \sqrt{\frac{z+1}{z}} - \frac{z}{z+1} \sqrt{-\frac{(z+1)^2}{z^2}} \operatorname{csch}^{-1}(\sqrt{z})$$

01.12.27.0281.01

$$\sin^{-1}\left(\frac{\sqrt{a+z}}{\sqrt{z}}\right) = \frac{\sqrt{a+z}}{\sqrt{\frac{a}{z}+1}\sqrt{z}} \left(\frac{\pi}{2} - \sqrt{-\frac{a}{z}} \sqrt{\frac{z}{a}} \operatorname{csch}^{-1}\left(\sqrt{\frac{z}{a}}\right)\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right)$  and  $\operatorname{csch}^{-1}(\sqrt{z})$

01.12.27.2054.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-z}}\right) = \frac{\pi}{2} - i \operatorname{csch}^{-1}(\sqrt{z}) ; \operatorname{Im}(z) \geq 0$$

01.12.27.2055.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-z}}\right) = \frac{\pi}{2} + i \operatorname{csch}^{-1}(\sqrt{z}) ; \operatorname{Im}(z) < 0$$

01.12.27.2056.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-z}}\right) = \frac{\pi}{2} - \sqrt{-\frac{1}{z}} \sqrt{z} \operatorname{csch}^{-1}(\sqrt{z})$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right)$  and  $\operatorname{csch}^{-1}(\sqrt{z})$

01.12.27.0277.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \frac{\pi}{2} - i \operatorname{csch}^{-1}(\sqrt{z}) ; \operatorname{Im}(z) \geq 0$$

01.12.27.2057.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \frac{\pi}{2} + i \operatorname{csch}^{-1}(\sqrt{z}) ; \operatorname{Im}(z) < 0$$

01.12.27.0278.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \frac{\pi}{2} - \sqrt{-\frac{1}{z}} \sqrt{z} \operatorname{csch}^{-1}(\sqrt{z})$$

Involving  $\sin^{-1}\left(\sqrt{az^c+1}\right)$



Involving  $\sin^{-1}(\sqrt{a z^c + 1})$  and  $\operatorname{csch}^{-1}\left(\frac{1}{\sqrt{a} z^{c/2}}\right)$

01.12.27.0284.01

$$\sin^{-1}(\sqrt{z^2 + 1}) = \frac{\pi}{2} - i \operatorname{csch}^{-1}\left(\frac{1}{z}\right); -\pi < \arg(z) \leq 0$$

01.12.27.2058.01

$$\sin^{-1}(\sqrt{z^2 + 1}) = i \operatorname{csch}^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2}; 0 < \arg(z) \leq \pi$$

01.12.27.0285.01

$$\sin^{-1}(\sqrt{z^2 + 1}) = \frac{\pi}{2} - \frac{\sqrt{-z^2}}{z} \operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

01.12.27.0294.01

$$\sin^{-1}(\sqrt{a z^c + 1}) = \frac{\sqrt{a} z^{c/2}}{\sqrt{-a z^c}} \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{a} z^{c/2}}\right) + \frac{\pi}{2}$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right)$  and  $\operatorname{csch}^{-1}(z)$

01.12.27.0287.02

$$\sin^{-1}\left(\frac{\sqrt{z^2 + 1}}{z}\right) = \frac{\pi}{2} - i \operatorname{csch}^{-1}(z); 0 \leq \arg(z) < \frac{\pi}{2} \vee i z < -1$$

01.12.27.2059.01

$$\sin^{-1}\left(\frac{\sqrt{z^2 + 1}}{z}\right) = i \operatorname{csch}^{-1}(z) + \frac{\pi}{2}; -\frac{\pi}{2} < \arg(z) < 0 \vee (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.2060.01

$$\sin^{-1}\left(\frac{\sqrt{z^2 + 1}}{z}\right) = i \operatorname{csch}^{-1}(z) - \frac{\pi}{2}; \frac{\pi}{2} < \arg(z) < \pi \vee (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.2061.01

$$\sin^{-1}\left(\frac{\sqrt{z^2 + 1}}{z}\right) = -i \operatorname{csch}^{-1}(z) - \frac{\pi}{2}; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0) \vee (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.0289.01

$$\sin^{-1}\left(\frac{\sqrt{z^2 + 1}}{z}\right) = \frac{\pi \sqrt{z^2}}{2z} - \sqrt{-\frac{1}{z^2}} \sqrt{z^2} \operatorname{csch}^{-1}(z); i z \notin (-1, 1)$$

01.12.27.0288.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{\sqrt{-z^4}}{z^2} \operatorname{csch}^{-1}(z) + \frac{\pi\sqrt{z^2}}{2z} \quad ; \operatorname{Re}(z) \operatorname{Im}(z) \neq 0$$

01.12.27.0290.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{\sqrt{z^2+1}}{2z^2\sqrt{-\frac{z^2+1}{z^4}}} \left( \pi \sqrt{-\frac{1}{z^2}} z + 2 \operatorname{csch}^{-1}(z) \right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right)$

#### Involving $\sin^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right)$ and $\operatorname{csch}^{-1}(z)$

01.12.27.2062.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = \frac{\pi}{2} - i \operatorname{csch}^{-1}(z) \quad ; \quad 0 \leq \arg(z) < \frac{\pi}{2} \vee \frac{\pi}{2} < \arg(z) < \pi \vee (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.2063.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = i \operatorname{csch}^{-1}(z) + \frac{\pi}{2} \quad ; \quad -\pi < \arg(z) < -\frac{\pi}{2} \vee -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0) \vee (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.2064.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = i \operatorname{csch}^{-1}(z) - \frac{\pi}{2} \quad ; \quad (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.2065.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = -i \operatorname{csch}^{-1}(z) - \frac{\pi}{2} \quad ; \quad (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.2066.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = \frac{\sqrt{-z^2(z^2+1)}}{\sqrt{z^2}\sqrt{-z^2-1}} \left( \frac{\pi}{2} - \sqrt{-\frac{1}{z^2}} z \operatorname{csch}^{-1}(z) \right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right)$

#### Involving $\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right)$ and $\operatorname{csch}^{-1}(z)$

01.12.27.2067.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = \frac{\pi}{2} - i \operatorname{csch}^{-1}(z) ; 0 \leq \arg(z) < \pi$$

01.12.27.2068.01

$$\sin^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = i \operatorname{csch}^{-1}(z) + \frac{\pi}{2} ; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2069.01

$$\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi}{2} - \sqrt{-\frac{1}{z^2}} z \operatorname{csch}^{-1}(z)$$

**Involving  $\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right)$**

**Involving  $\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right)$  and  $\operatorname{csch}^{-1}(z)$**

01.12.27.2070.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{\pi}{2} - i \operatorname{csch}^{-1}(z) ; 0 \leq \arg(z) < \pi$$

01.12.27.2071.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = i \operatorname{csch}^{-1}(z) + \frac{\pi}{2} ; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2072.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{\pi}{2} - \sqrt{-\frac{1}{z^2}} z \operatorname{csch}^{-1}(z)$$

**Involving  $\sin^{-1}\left(2z\sqrt{-1-z^2}\right)$**

**Involving  $\sin^{-1}\left(2z\sqrt{-1-z^2}\right)$  and  $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$**

01.12.27.0286.01

$$\sin^{-1}\left(2z\sqrt{-z^2-1}\right) = \frac{2\sqrt{-z^4}}{z^2} \operatorname{csch}^{-1}\left(\frac{1}{z}\right) ; |\arg(z)| \leq \frac{\pi}{4} \vee \frac{3\pi}{4} \leq |\arg(z)| \leq \pi$$

01.12.27.2073.01

$$\sin^{-1}\left(2z\sqrt{-z^2-1}\right) = \frac{\pi\sqrt{2z^2+1}\sqrt{z^4+z^2}}{2\sqrt{z^2}\sqrt{-2z^2-1}\sqrt{z^2+1}}\left(-\frac{\sqrt{-z^2}}{z}-i\sqrt{\frac{i}{z}}\sqrt{-iz}\sqrt{\frac{1}{1-i\sqrt{2}z}}\sqrt{1-i\sqrt{2}z}+i\sqrt{\frac{-i}{z}}\sqrt{iz}\sqrt{\frac{1}{\sqrt{2}iz+1}}\sqrt{\sqrt{2}iz+1}-\frac{\sqrt{z^4+z^2}}{z\sqrt{-z^2-1}}\right)-\frac{2\sqrt{2z^2+1}\sqrt{z^4+z^2}}{\sqrt{z^2}\sqrt{-2z^2-1}\sqrt{z^2+1}}\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{2\sqrt{-1-z^2}}{z^2}\right)$

Involving  $\sin^{-1}\left(\frac{2\sqrt{-1-z^2}}{z^2}\right)$  and  $\operatorname{csch}^{-1}(z)$

01.12.27.2074.01

$$\sin^{-1}\left(\frac{2\sqrt{-1-z^2}}{z^2}\right) = \frac{2\sqrt{-z^2}}{z}\operatorname{csch}^{-1}(z) ; |\arg(z)| \leq \frac{\pi}{4} \vee \frac{3\pi}{4} \leq |\arg(z)| \leq \pi \vee |z| \geq \sqrt{2}$$

01.12.27.2075.01

$$\sin^{-1}\left(\frac{2\sqrt{-z^2-1}}{z^2}\right) = \frac{z^3\sqrt{-z^2-2}\sqrt{-z^2-1}}{2\sqrt{1-iz}(iz+1)\sqrt{-z^4-3z^2-2}}\sqrt{\frac{z^2+1}{z^4}}\sqrt{\frac{i-z}{z}}\sqrt{\frac{-i}{z}}\left(\pi\left(-\frac{z^3}{z^2+1}\sqrt{-\frac{z^2+1}{z^2}}\sqrt{\frac{z^2+1}{z^4}}+\sqrt{-\frac{1}{z^2}}z+i\sqrt{\frac{z-i\sqrt{2}}{z}}\sqrt{\frac{-i}{z}}\sqrt{iz}\sqrt{\frac{z}{-i\sqrt{2}+z}}-i\sqrt{\frac{z+i\sqrt{2}}{z}}\sqrt{\frac{i}{z}}\sqrt{-iz}\sqrt{\frac{z}{i\sqrt{2}+z}}\right)+4\operatorname{csch}^{-1}(z)\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+z^2}}{2}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+z^2}}{2}}\right)$  and  $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.12.27.0291.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{z^2+1}}{2}}\right) = \frac{i}{2}\operatorname{csch}^{-1}\left(\frac{1}{z}\right) ; -\pi < \arg(z) \leq 0$$

01.12.27.2076.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{z^2+1}\right)}\right) = -\frac{i}{2} \operatorname{csch}^{-1}\left(\frac{1}{z}\right); 0 < \arg(z) \leq \pi$$

01.12.27.0293.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{z^2+1}}{2}}\right) = \frac{\sqrt{-z^2}}{2z} \operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(z\sqrt{1-\sqrt{1+z^2}}/\sqrt{2z^2}\right)$

Involving  $\sin^{-1}\left(z\sqrt{1-\sqrt{1+z^2}}/\sqrt{2z^2}\right)$  and  $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.12.27.2077.01

$$\sin^{-1}\left(\frac{z\sqrt{1-\sqrt{z^2+1}}}{\sqrt{2}\sqrt{z^2}}\right) = \frac{i}{2} \operatorname{csch}^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} < \arg(z) \leq \pi \vee -\frac{\pi}{2} < \arg(z) \leq 0$$

01.12.27.2078.01

$$\sin^{-1}\left(\frac{z\sqrt{1-\sqrt{z^2+1}}}{\sqrt{2}\sqrt{z^2}}\right) = -\frac{i}{2} \operatorname{csch}^{-1}\left(\frac{1}{z}\right); 0 < \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.2079.01

$$\sin^{-1}\left(\frac{z\sqrt{1-\sqrt{z^2+1}}}{\sqrt{2}\sqrt{z^2}}\right) = \frac{\sqrt{-z^4}}{2z^2} \operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(z\sqrt{\left(1-\sqrt{1+z^2}\right)/(2z^2)}\right)$

Involving  $\sin^{-1}\left(z\sqrt{\left(1-\sqrt{1+z^2}\right)/(2z^2)}\right)$  and  $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.12.27.2080.01

$$\sin^{-1} \left( z \sqrt{\frac{1 - \sqrt{z^2 + 1}}{2z^2}} \right) = \frac{i}{2} \operatorname{csch}^{-1} \left( \frac{1}{z} \right); 0 \leq \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2081.01

$$\sin^{-1} \left( z \sqrt{\frac{1 - \sqrt{z^2 + 1}}{2z^2}} \right) = -\frac{i}{2} \operatorname{csch}^{-1} \left( \frac{1}{z} \right); \frac{\pi}{2} < \arg(z) < \pi \vee -\frac{\pi}{2} < \arg(z) < 0$$

01.12.27.2082.01

$$\sin^{-1} \left( z \sqrt{\frac{1 - \sqrt{z^2 + 1}}{2z^2}} \right) = \frac{1}{2} \sqrt{-\frac{1}{z^2}} \sqrt{z^2} \operatorname{csch}^{-1} \left( \frac{1}{z} \right)$$

Involving  $\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 + 1}}}{\sqrt{2z}} \right)$

Involving  $\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 + 1}}}{\sqrt{2z}} \right)$  and  $\operatorname{csch}^{-1}(z)$

01.12.27.2083.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 + 1}}}{\sqrt{2z}} \right) = \frac{1}{2} i \operatorname{csch}^{-1}(z); 0 < \arg(z) < \frac{\pi}{2} \vee (iz \in \mathbb{R} \wedge iz < -1)$$

01.12.27.2084.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 + 1}}}{\sqrt{2z}} \right) = -\frac{1}{2} i \operatorname{csch}^{-1}(z); -\frac{\pi}{2} < \arg(z) < 0 \vee (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.2085.01

$$\sin^{-1} \left( \frac{\sqrt{z - \sqrt{z^2 + 1}}}{\sqrt{2z}} \right) = \frac{\pi}{2} - \frac{1}{2} i \operatorname{csch}^{-1}(z); \frac{\pi}{2} < \arg(z) < \pi \vee (-iz \in \mathbb{R} \wedge 0 < -iz < 1)$$

01.12.27.2086.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 + 1}}}{\sqrt{2z}}\right) = \frac{1}{2} i \operatorname{csch}^{-1}(z) + \frac{\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (i z \in \mathbb{R} \wedge i z > 1) \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2087.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 + 1}}}{\sqrt{2z}}\right) = \frac{z^2}{2} \sqrt{-\frac{1}{z^4}} \sqrt{\frac{1}{z^2 + 1}} \sqrt{z^2 + 1} \operatorname{csch}^{-1}(z) + \frac{1}{4} \pi \left(1 - z \sqrt{\frac{1}{z^2}} \sqrt{\frac{1}{z^2 + 1}} \sqrt{z^2 + 1}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\left(z - \sqrt{1 + z^2}\right) / (2z)}\right)$

Involving  $\sin^{-1}\left(\sqrt{\left(z - \sqrt{1 + z^2}\right) / (2z)}\right)$  and  $\operatorname{csch}^{-1}(z)$

01.12.27.2088.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{1 + z^2}}{2z}}\right) = \frac{1}{2} i \operatorname{csch}^{-1}(z) /; 0 < \arg(z) < \frac{\pi}{2} \vee (i z \in \mathbb{R} \wedge i z < -1)$$

01.12.27.2089.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{1 + z^2}}{2z}}\right) = -\frac{1}{2} i \operatorname{csch}^{-1}(z) /; -\frac{\pi}{2} < \arg(z) < 0 \vee (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.12.27.2090.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{1 + z^2}}{2z}}\right) = \frac{\pi}{2} - \frac{1}{2} i \operatorname{csch}^{-1}(z) /; \frac{\pi}{2} < \arg(z) < \pi \vee (-i z \in \mathbb{R} \wedge 0 < -i z < 1)$$

01.12.27.2091.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{1 + z^2}}{2z}}\right) = \frac{1}{2} i \operatorname{csch}^{-1}(z) + \frac{\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (i z \in \mathbb{R} \wedge i z > 1) \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2092.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 + 1}}{2z}}\right) = \frac{z^2}{2} \sqrt{-\frac{1}{z^4}} \sqrt{\frac{1}{z^2 + 1}} \sqrt{z^2 + 1} \operatorname{csch}^{-1}(z) + \frac{\pi}{4} \left(1 - z \sqrt{\frac{1}{z^2}} \sqrt{\frac{1}{z^2 + 1}} \sqrt{z^2 + 1}\right)$$

Involving  $\sin^{-1}\left(a z^{-c} \sqrt{\frac{z^{2c}}{a^2} + 1}\right)$

Involving  $\sin^{-1}\left(a z^{-c} \sqrt{\frac{z^{2c}}{a^2} + 1}\right)$  and  $\operatorname{csch}^{-1}\left(\frac{z^c}{a}\right)$

01.12.27.2093.01

$$\sin^{-1}\left(a z^{-c} \sqrt{\frac{z^{2c}}{a^2} + 1}\right) = \frac{a}{2 z^{2c} \sqrt{-a^2 z^{-4c} (z^{2c} + a^2)}} \sqrt{\frac{z^{2c}}{a^2} + 1} \left( \pi \sqrt{-\frac{a^2}{z^{2c}}} z^c + 2 a \operatorname{csch}^{-1}\left(\frac{z^c}{a}\right) \right)$$

Involving  $\operatorname{sech}^{-1}$

Involving  $\sin^{-1}(z)$

Involving  $\sin^{-1}(z)$  and  $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.12.27.0296.01

$$\sin^{-1}(z) = \frac{\pi}{2} + i \operatorname{sech}^{-1}\left(\frac{1}{z}\right); \operatorname{Im}(z) > 0 \vee 0 < z < 1$$

01.12.27.0297.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \operatorname{sech}^{-1}\left(\frac{1}{z}\right); \operatorname{Im}(z) < 0 \vee z > 1$$

01.12.27.0298.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \frac{\sqrt{1-z}}{\sqrt{z-1}} \operatorname{sech}^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{sech}^{-1}\left(-\frac{1}{z}\right)$

01.12.27.2094.01

$$\sin^{-1}(z) = i \operatorname{sech}^{-1}\left(-\frac{1}{z}\right) - \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2095.01

$$\sin^{-1}(z) = -i \operatorname{sech}^{-1}\left(-\frac{1}{z}\right) - \frac{\pi}{2}; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > -1)$$

01.12.27.2096.01

$$\sin^{-1}(z) = \frac{\sqrt{1+z}}{\sqrt{-1-z}} \operatorname{sech}^{-1}\left(-\frac{1}{z}\right) - \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{sech}^{-1}\left(\frac{1}{1-2z^2}\right)$



01.12.27.0301.01

$$\sin^{-1}(z) = -\frac{i}{2} \operatorname{sech}^{-1}\left(\frac{1}{1-2z^2}\right); -\pi < \arg(z) \leq 0$$

01.12.27.2097.01

$$\sin^{-1}(z) = \frac{i}{2} \operatorname{sech}^{-1}\left(\frac{1}{1-2z^2}\right); 0 < \arg(z) \leq \pi$$

01.12.27.0302.01

$$\sin^{-1}(z) = -\frac{\sqrt{-z^2}}{2z} \operatorname{sech}^{-1}\left(\frac{1}{1-2z^2}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{sech}^{-1}\left(\frac{1}{2z^2-1}\right)$

01.12.27.2098.01

$$\sin^{-1}(z) = \frac{1}{2} i \operatorname{sech}^{-1}\left(\frac{1}{2z^2-1}\right) + \frac{\pi}{2}; 0 < \arg(z) \leq \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2099.01

$$\sin^{-1}(z) = \frac{\pi}{2} - \frac{1}{2} i \operatorname{sech}^{-1}\left(\frac{1}{2z^2-1}\right); -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2100.01

$$\sin^{-1}(z) = \frac{1}{2} i \operatorname{sech}^{-1}\left(\frac{1}{2z^2-1}\right) - \frac{\pi}{2}; \frac{\pi}{2} < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2101.01

$$\sin^{-1}(z) = -\frac{1}{2} i \operatorname{sech}^{-1}\left(\frac{1}{2z^2-1}\right) - \frac{\pi}{2}; -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.2102.01

$$\sin^{-1}(z) = \frac{z\sqrt{z^2-1}}{2\sqrt{z^2-z^4}} \operatorname{sech}^{-1}\left(\frac{1}{2z^2-1}\right) + \frac{\pi\sqrt{z^2}}{2z}$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{sech}^{-1}\left(\frac{\sqrt{2}}{\sqrt{1+z}}\right)$

01.12.27.2103.01

$$\sin^{-1}(z) = 2i \operatorname{sech}^{-1}\left(\frac{\sqrt{2}}{\sqrt{1+z}}\right) + \frac{\pi}{2}; 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2104.01

$$\sin^{-1}(z) = -2i \operatorname{sech}^{-1}\left(\frac{\sqrt{2}}{\sqrt{1+z}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2105.01

$$\sin^{-1}(z) = -2\sqrt{-z^2} \sqrt{\frac{1}{z-1}} \sqrt{\frac{z-1}{z^2}} \operatorname{sech}^{-1}\left(\frac{\sqrt{2}}{\sqrt{1+z}}\right) + \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{sech}^{-1}\left(\sqrt{\frac{2}{1+z}}\right)$

01.12.27.2106.01

$$\sin^{-1}(z) = 2i \operatorname{sech}^{-1}\left(\sqrt{\frac{2}{1+z}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.2107.01

$$\sin^{-1}(z) = -2i \operatorname{sech}^{-1}\left(\sqrt{\frac{2}{1+z}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2108.01

$$\sin^{-1}(z) = -\frac{3\pi}{2} + 2i \operatorname{sech}^{-1}\left(\sqrt{\frac{2}{1+z}}\right); (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2109.01

$$\sin^{-1}(z) = -2\sqrt{-z^2} \sqrt{\frac{1}{z-1}} \sqrt{\frac{z-1}{z^2}} \operatorname{sech}^{-1}\left(\sqrt{\frac{2}{1+z}}\right) + \left(\sqrt{1+z} \sqrt{\frac{1}{1+z}} - \frac{1}{2}\right)\pi$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{sech}^{-1}\left(\frac{\sqrt{2}}{\sqrt{1-z}}\right)$

01.12.27.2110.01

$$\sin^{-1}(z) = 2i \operatorname{sech}^{-1}\left(\frac{\sqrt{2}}{\sqrt{1-z}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2111.01

$$\sin^{-1}(z) = -2i \operatorname{sech}^{-1}\left(\frac{\sqrt{2}}{\sqrt{1-z}}\right) - \frac{\pi}{2}; -\pi < \arg(z) \leq 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.2112.01

$$\sin^{-1}(z) = 2\sqrt{-z^2} \sqrt{-\frac{1}{z+1}} \sqrt{-\frac{z+1}{z^2}} \operatorname{sech}^{-1}\left(\frac{\sqrt{2}}{\sqrt{1-z}}\right) - \frac{\pi}{2}$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{sech}^{-1}\left(\sqrt{\frac{2}{1-z}}\right)$

01.12.27.2113.01

$$\sin^{-1}(z) = 2i \operatorname{sech}^{-1}\left(\sqrt{\frac{2}{1-z}}\right) - \frac{\pi}{2}; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2114.01

$$\sin^{-1}(z) = -2i \operatorname{sech}^{-1}\left(\sqrt{\frac{2}{1-z}}\right) - \frac{\pi}{2}; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.12.27.2115.01

$$\sin^{-1}(z) = \frac{3\pi}{2} - 2i \operatorname{sech}^{-1}\left(\sqrt{\frac{2}{1-z}}\right); (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2116.01

$$\sin^{-1}(z) = 2\sqrt{-z^2} \sqrt{-\frac{1}{z+1}} \sqrt{-\frac{z+1}{z^2}} \operatorname{sech}^{-1}\left(\sqrt{\frac{2}{1-z}}\right) - \left(\sqrt{1-z} \sqrt{\frac{1}{1-z}} - \frac{1}{2}\right)\pi$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z^2}}\right)$

01.12.27.2117.01

$$\sin^{-1}(z) = i \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z^2}}\right) + \frac{\pi}{2}; 0 < \arg(z) \leq \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2118.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z^2}}\right); -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2119.01

$$\sin^{-1}(z) = i \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z^2}}\right) - \frac{\pi}{2}; \frac{\pi}{2} < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2120.01

$$\sin^{-1}(z) = -\frac{\pi}{2} - i \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z^2}}\right); -\pi < \arg(z) \leq -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.2121.01

$$\sin^{-1}(z) = \frac{\pi\sqrt{z^2}}{2z} - \frac{\sqrt{-z^2}}{z} \sqrt{\frac{z-1}{z+1}} \sqrt{\frac{z+1}{z-1}} \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z^2}}\right)$

01.12.27.2122.01

$$\sin^{-1}(z) = i \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z^2}}\right) + \frac{\pi}{2}; 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2123.01

$$\sin^{-1}(z) = \frac{\pi}{2} - i \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z^2}}\right); -\frac{\pi}{2} \leq \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2124.01

$$\sin^{-1}(z) = i \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z^2}}\right) - \frac{\pi}{2}; \frac{\pi}{2} \leq \arg(z) < \pi \quad \vee \quad (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2125.01

$$\sin^{-1}(z) = -\frac{\pi}{2} - i \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z^2}}\right); -\pi < \arg(z) < -\frac{\pi}{2} \quad \vee \quad (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.2126.01

$$\sin^{-1}(z) = \sqrt{-\frac{1}{z^2}} \sqrt{\frac{1}{1-z^2}} \sqrt{1-z^2} \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z^2}}\right) z + \frac{1}{2}\pi \sqrt{\frac{1}{z^2}} z$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

01.12.27.0299.01

$$\sin^{-1}(z) = -i \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right); -\pi < \arg(z) \leq 0$$

01.12.27.2127.01

$$\sin^{-1}(z) = i \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right); 0 < \arg(z) \leq \pi$$

01.12.27.0300.01

$$\sin^{-1}(z) = -\frac{\sqrt{-z^2}}{z} \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{sech}^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$

01.12.27.2128.01

$$\sin^{-1}(z) = -i \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2129.01

$$\sin^{-1}(z) = i \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.2130.01

$$\sin^{-1}(z) = \pi - i \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right); (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2131.01

$$\sin^{-1}(z) = i \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) - \pi /; (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2132.01

$$\sin^{-1}(z) = \frac{1}{2} \left( \sqrt{\frac{1}{z+1}} \sqrt{z+1} - \sqrt{\frac{1}{1-z}} \sqrt{1-z} \right) \pi - \frac{\sqrt{-z^2}}{z} \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$$

Involving  $\sin^{-1}(z)$  and  $\operatorname{sech}^{-1}\left(\frac{1}{2z\sqrt{1-z^2}}\right)$

01.12.27.2133.01

$$\sin^{-1}(z) = \frac{\pi}{4} - \frac{1}{2} i \operatorname{sech}^{-1}\left(\frac{1}{2z\sqrt{1-z^2}}\right) /; \operatorname{Re}(z) > -\frac{1}{\sqrt{2}} \wedge \operatorname{Im}(z) < 0$$

01.12.27.2134.01

$$\sin^{-1}(z) = \frac{\pi}{4} + \frac{1}{2} i \operatorname{sech}^{-1}\left(\frac{1}{2z\sqrt{1-z^2}}\right) /; \operatorname{Re}(z) > -\frac{1}{\sqrt{2}} \wedge \operatorname{Im}(z) > 0$$

01.12.27.2135.01

$$\sin^{-1}(z) = \frac{\pi}{4} - \frac{\sqrt{-z^2}}{2z} \operatorname{sech}^{-1}\left(\frac{1}{2z\sqrt{1-z^2}}\right) /; \operatorname{Re}(z) > -\frac{1}{\sqrt{2}} \wedge \operatorname{Im}(z) \neq 0$$

01.12.27.2136.01

$$\sin^{-1}(z) = \frac{1}{4} \pi \left( \frac{\sqrt{z^2}}{z} - \sqrt{\frac{1}{z}} \sqrt{z} \sqrt{\frac{1}{\sqrt{2}z+1}} \sqrt{\sqrt{2}z+1} + \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{\frac{1}{1-\sqrt{2}z}} \sqrt{1-\sqrt{2}z} + \frac{\sqrt{z^4-z^2}}{z\sqrt{z^2-1}} \right) - \frac{\sqrt{-z^2} \sqrt{z^2-1} \sqrt{2z^2-1}}{2\sqrt{1-2z^2} \sqrt{z^4-z^2}} \left( \frac{\pi}{2} - \frac{1}{\sqrt{2z\sqrt{1-z^2}-1}} \sqrt{1-2z\sqrt{1-z^2}} \operatorname{sech}^{-1}\left(\frac{1}{2z\sqrt{1-z^2}}\right) \right)$$

Involving  $\sin^{-1}(\sqrt{cz})$

Involving  $\sin^{-1}(\sqrt{z})$  and  $\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.2137.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} - i \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2138.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} + i \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < 1)$$

01.12.27.2139.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} - \frac{\sqrt{1-z}}{\sqrt{z-1}} \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving  $\sin^{-1}(\sqrt{z})$  and  $\operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.2140.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} - i \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2141.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} + i \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2142.01

$$\sin^{-1}(\sqrt{z}) = i \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2143.01

$$\sin^{-1}(\sqrt{z}) = \frac{\pi}{2} \sqrt{\frac{1}{z}} \sqrt{z} - \frac{\sqrt{1-z}}{\sqrt{z-1}} \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving  $\sin^{-1}(\sqrt{-z})$  and  $\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{1+z}}\right)$

01.12.27.2144.01

$$\sin^{-1}(\sqrt{-z}) = i \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{1+z}}\right); -\pi < \arg(z) \leq 0$$

01.12.27.2145.01

$$\sin^{-1}(\sqrt{-z}) = -i \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{1+z}}\right); 0 < \arg(z) \leq \pi$$

01.12.27.2146.01

$$\sin^{-1}(\sqrt{-z}) = \frac{\sqrt{-z^2}}{z} \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{1+z}}\right)$$

Involving  $\sin^{-1}(\sqrt{-z})$  and  $\operatorname{sech}^{-1}\left(\frac{1}{1+2z}\right)$

01.12.27.2147.01

$$\sin^{-1}(\sqrt{-z}) = \frac{i}{2} \operatorname{sech}^{-1}\left(\frac{1}{1+2z}\right); -\pi < \arg(z) \leq 0$$

01.12.27.2148.01

$$\sin^{-1}(\sqrt{-z}) = -\frac{i}{2} \operatorname{sech}^{-1}\left(\frac{1}{1+2z}\right); 0 < \arg(z) \leq \pi$$

01.12.27.2149.01

$$\sin^{-1}(\sqrt{-z}) = \frac{\sqrt{-z^2}}{2z} \operatorname{sech}^{-1}\left(\frac{1}{1+2z}\right)$$

### Involving $\sin^{-1}\left(\frac{1}{\sqrt{cz}}\right)$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}(\sqrt{z})$

01.12.27.0307.02

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi}{2} - i \operatorname{sech}^{-1}(\sqrt{z}); 0 < \arg(z) \leq \pi \vee 0 < z < 1$$

01.12.27.2150.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = i \operatorname{sech}^{-1}(\sqrt{z}) + \frac{\pi}{2}; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0308.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi}{2} - \frac{\sqrt{z-1}}{\sqrt{1-z}} \operatorname{sech}^{-1}(\sqrt{z})$$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(1/\sqrt{\frac{1}{z}}\right)$

01.12.27.2151.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi}{2} - i \operatorname{sech}^{-1}\left(1/\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2152.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = i \operatorname{sech}^{-1}\left(1/\sqrt{\frac{1}{z}}\right) + \frac{\pi}{2}; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2153.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i \operatorname{sech}^{-1}\left(1/\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2}; (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2154.01

$$\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi}{2} \sqrt{z} \sqrt{\frac{1}{z}} - \frac{\sqrt{z-1}}{\sqrt{1-z}} \operatorname{sech}^{-1}\left(1/\sqrt{\frac{1}{z}}\right)$$

#### Involving $\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$

01.12.27.2155.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = i \operatorname{sech}^{-1}\left(\sqrt{\frac{z}{z+1}}\right); \operatorname{Im}(z) > 0$$

01.12.27.2156.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -i \operatorname{sech}^{-1}\left(\sqrt{\frac{z}{z+1}}\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 0) \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2157.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \pi - i \operatorname{sech}^{-1}\left(\sqrt{\frac{z}{z+1}}\right); (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.2158.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{\pi}{2} \left(1 - \sqrt{\frac{z}{z+1}} \sqrt{\frac{z+1}{z}}\right) - \sqrt{-z} \sqrt{\frac{1}{z}} \operatorname{sech}^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$$

Involving  $\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right)$  and  $\operatorname{sech}^{-1}\left(\frac{z}{z+2}\right)$

01.12.27.2159.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -\frac{i}{2} \operatorname{sech}^{-1}\left(\frac{z}{z+2}\right); \operatorname{Im}(z) \leq 0$$

01.12.27.2160.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{1}{2} i \operatorname{sech}^{-1}\left(\frac{z}{z+2}\right); 0 < \arg(z) < \pi$$

01.12.27.2161.01

$$\sin^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -\frac{\sqrt{-z}}{2} \sqrt{\frac{1}{z}} \operatorname{sech}^{-1}\left(\frac{z}{z+2}\right)$$

Involving  $\sin^{-1}\left(\sqrt{z^2}\right)$

Involving  $\sin^{-1}\left(\sqrt{z^2}\right)$  and  $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.12.27.2162.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = i \operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2}; 0 < \arg(z) \leq \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2163.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = \frac{\pi}{2} - i \operatorname{sech}^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2164.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = -i \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}; \frac{\pi}{2} < \arg(z) \leq \pi$$



01.12.27.2165.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = i \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0324.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = \frac{\pi}{2} - \frac{\sqrt{1-z}}{\sqrt{z-1}} \operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0325.01

$$\sin^{-1}\left(\sqrt{z^2}\right) = \frac{\sqrt{z^2}}{z} \left( \frac{\pi}{2} - \frac{\sqrt{1-z}}{\sqrt{z-1}} \operatorname{sech}^{-1}\left(\frac{1}{z}\right) \right)$$

### Involving $\sin^{-1}(a(bz^c)^m)$

Involving  $\sin^{-1}(a(bz^c)^m)$  and  $\operatorname{sech}^{-1}\left(\frac{1}{ab^m z^{mc}}\right)$

01.12.27.0323.01

$$\sin^{-1}(a(bz^c)^m) = \frac{(bz^c)^m}{b^m z^{mc}} \left( \frac{\pi}{2} - \frac{\sqrt{1-ab^m z^{mc}}}{\sqrt{ab^m z^{mc}-1}} \operatorname{sech}^{-1}\left(\frac{1}{ab^m z^{mc}}\right) \right) /; 2m \in \mathbb{Z}$$

### Involving $\sin^{-1}(1-2z^2)$

Involving  $\sin^{-1}(1-2z^2)$  and  $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.12.27.0303.02

$$\sin^{-1}(1-2z^2) = -\frac{\pi}{2} - 2i \operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) \leq \frac{\pi}{2} \vee 0 < z < 1$$

01.12.27.2166.01

$$\sin^{-1}(1-2z^2) = 2i \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2} /; -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2167.01

$$\sin^{-1}(1-2z^2) = 2i \operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{3\pi}{2} /; \frac{\pi}{2} < \arg(z) \leq \pi$$

01.12.27.2168.01

$$\sin^{-1}(1-2z^2) = \frac{3\pi}{2} - 2i \operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0304.01

$$\sin^{-1}(1-2z^2) = \pi \left( \frac{1}{2} - \frac{\sqrt{z^2}}{z} \right) + \frac{2\sqrt{z^2}\sqrt{1-z}}{z\sqrt{z-1}} \operatorname{sech}^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}(2z^2-1)$

Involving  $\sin^{-1}(2z^2 - 1)$  and  $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.12.27.2169.01

$$\sin^{-1}(2z^2 - 1) = \frac{\pi}{2} + 2i \operatorname{sech}^{-1}\left(\frac{1}{z}\right); 0 < \arg(z) \leq \frac{\pi}{2} \quad \bigvee \quad (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2170.01

$$\sin^{-1}(2z^2 - 1) = -2i \operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2}; -\frac{\pi}{2} < \arg(z) < 0 \quad \bigvee \quad (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2171.01

$$\sin^{-1}(2z^2 - 1) = -2i \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{3\pi}{2}; \frac{\pi}{2} < \arg(z) \leq \pi$$

01.12.27.2172.01

$$\sin^{-1}(2z^2 - 1) = -\frac{3\pi}{2} + 2i \operatorname{sech}^{-1}\left(\frac{1}{z}\right); -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.2173.01

$$\sin^{-1}(2z^2 - 1) = -\pi \left( \frac{1}{2} - \frac{\sqrt{z^2}}{z} \right) - \frac{2\sqrt{z^2} \sqrt{1-z}}{z\sqrt{z-1}} \operatorname{sech}^{-1}\left(\frac{1}{z}\right)$$

Involving  $\sin^{-1}\left(\frac{z^2-2}{z^2}\right)$

Involving  $\sin^{-1}\left(\frac{z^2-2}{z^2}\right)$  and  $\operatorname{sech}^{-1}(z)$

01.12.27.2174.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = 2i \operatorname{sech}^{-1}(z) - \frac{\pi}{2}; 0 < \arg(z) < \frac{\pi}{2} \quad \bigvee \quad (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2175.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = -2i \operatorname{sech}^{-1}(z) - \frac{\pi}{2}; -\frac{\pi}{2} \leq \arg(z) < 0 \quad \bigvee \quad (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2176.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = \frac{3\pi}{2} - 2i \operatorname{sech}^{-1}(z); \frac{\pi}{2} \leq \arg(z) < \pi$$

01.12.27.2177.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = 2i \operatorname{sech}^{-1}(z) + \frac{3\pi}{2}; -\pi < \arg(z) < -\frac{\pi}{2} \quad \bigvee \quad (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2178.01

$$\sin^{-1}\left(\frac{z^2-2}{z^2}\right) = \pi \left( \frac{1}{2} - \sqrt{\frac{1}{z^2} - z} \right) + \frac{2z}{\sqrt{\frac{1}{z} - 1}} \sqrt{1 - \frac{1}{z}} \sqrt{\frac{1}{z^2}} \operatorname{sech}^{-1}(z)$$

### Involving $\sin^{-1}\left(\frac{2-z^2}{z^2}\right)$

#### Involving $\sin^{-1}\left(\frac{2-z^2}{z^2}\right)$ and $\operatorname{sech}^{-1}(z)$

01.12.27.2179.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -2i \operatorname{sech}^{-1}(z) + \frac{\pi}{2} /; 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2180.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = 2i \operatorname{sech}^{-1}(z) + \frac{\pi}{2} /; -\frac{\pi}{2} \leq \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2181.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -\frac{3\pi}{2} + 2i \operatorname{sech}^{-1}(z) /; \frac{\pi}{2} \leq \arg(z) < \pi$$

01.12.27.2182.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -2i \operatorname{sech}^{-1}(z) - \frac{3\pi}{2} /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2183.01

$$\sin^{-1}\left(\frac{2-z^2}{z^2}\right) = -\pi \left( \frac{1}{2} - \sqrt{\frac{1}{z^2} - z} \right) - \frac{2z}{\sqrt{\frac{1}{z} - 1}} \sqrt{1 - \frac{1}{z}} \sqrt{\frac{1}{z^2}} \operatorname{sech}^{-1}(z)$$

### Involving $\sin^{-1}(\sqrt{1-z})$

#### Involving $\sin^{-1}(\sqrt{1-z})$ and $\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.12.27.2184.01

$$\sin^{-1}(\sqrt{1-z}) = i \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0305.02

$$\sin^{-1}(\sqrt{1-z}) = -i \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; 0 < \arg(z) \leq \pi \vee 0 < z < 1$$

01.12.27.0306.01

$$\sin^{-1}(\sqrt{1-z}) = \frac{\sqrt{1-z}}{\sqrt{z-1}} \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

#### Involving $\sin^{-1}(\sqrt{1-z})$ and $\operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.12.27.2185.01

$$\sin^{-1}(\sqrt{1-z}) = i \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2186.01

$$\sin^{-1}(\sqrt{1-z}) = -i \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2187.01

$$\sin^{-1}(\sqrt{1-z}) = \pi - i \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right); (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2188.01

$$\sin^{-1}(\sqrt{1-z}) = \frac{1}{2}\pi \left(1 - \sqrt{z}\sqrt{\frac{1}{z}}\right) + \frac{\sqrt{1-z}}{\sqrt{z-1}} \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{1+cz}}{\sqrt{2}}\right)$

#### Involving $\sin^{-1}\left(\sqrt{\frac{1+z}{2}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.12.27.2189.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{2}}\right) = \frac{1}{2}\left(\pi - i \operatorname{sech}^{-1}\left(\frac{1}{z}\right)\right); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0309.02

$$\sin^{-1}\left(\sqrt{\frac{1+z}{2}}\right) = \frac{1}{2}\left(\pi + i \operatorname{sech}^{-1}\left(\frac{1}{z}\right)\right); 0 < \arg(z) \leq \pi \vee 0 < z < 1$$

01.12.27.0310.01

$$\sin^{-1}\left(\sqrt{\frac{1+z}{2}}\right) = \frac{1}{2}\left(\pi - \frac{\sqrt{1-z}}{\sqrt{z-1}} \operatorname{sech}^{-1}\left(\frac{1}{z}\right)\right)$$

#### Involving $\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.12.27.2190.01

$$\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right) = \frac{i}{2} \operatorname{sech}^{-1}\left(\frac{1}{z}\right); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0311.02

$$\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right) = -\frac{i}{2} \operatorname{sech}^{-1}\left(\frac{1}{z}\right); 0 < \arg(z) \leq \pi \vee 0 < z < 1$$

01.12.27.0312.01

$$\sin^{-1}\left(\sqrt{\frac{1-z}{2}}\right) = \frac{1}{2} \frac{\sqrt{1-z}}{\sqrt{z-1}} \operatorname{sech}^{-1}\left(\frac{1}{z}\right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{z+a}}{\sqrt{z}}\right)$

#### Involving $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}(\sqrt{z})$

01.12.27.2191.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = i \operatorname{sech}^{-1}(\sqrt{z}) /; 0 < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2192.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = -i \operatorname{sech}^{-1}(\sqrt{z}) /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0315.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\sqrt{z-1}}{\sqrt{1-z}} \operatorname{sech}^{-1}(\sqrt{z}) /; |\arg(z)| < \pi$$

01.12.27.0316.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{1}{2} \left( 2 \sqrt{\frac{1}{z}} \sqrt{z} \frac{\sqrt{z-1}}{\sqrt{1-z}} \operatorname{sech}^{-1}(\sqrt{z}) - \pi \sqrt{\frac{1}{z}} \sqrt{z} + \pi \right)$$

#### Involving $\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{z}{z+2}\right)$

01.12.27.2193.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\pi}{2} - \frac{1}{2} i \operatorname{sech}^{-1}\left(\frac{z}{z+2}\right) /; 0 \leq \arg(z) < \pi$$

01.12.27.2194.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\pi}{2} + \frac{i}{2} \operatorname{sech}^{-1}\left(\frac{z}{z+2}\right) /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2195.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = -\frac{\pi}{2} - \frac{1}{2} i \operatorname{sech}^{-1}\left(\frac{z}{z+2}\right) /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.2196.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\sqrt{-z} \sqrt{z+1}}{2 \sqrt{-z-1} \sqrt{z}} \left( \pi - z \sqrt{-\frac{1}{z^2}} \operatorname{sech}^{-1}\left(\frac{z}{z+2}\right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right)$  and  $\operatorname{sech}^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$

01.12.27.2197.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\pi}{2} - i \operatorname{sech}^{-1}\left(\sqrt{\frac{z}{z+1}}\right); 0 < \arg(z) < \pi \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.2198.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\pi}{2} + i \operatorname{sech}^{-1}\left(\sqrt{\frac{z}{z+1}}\right); -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2199.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \frac{\pi}{2} - z \sqrt{-\frac{1}{z^2}} \sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{z+1}} \operatorname{sech}^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$  and  $\operatorname{sech}^{-1}(\sqrt{z})$

01.12.27.2200.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = i \operatorname{sech}^{-1}(\sqrt{z}); \operatorname{Im}(z) > 0$$

01.12.27.2201.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -i \operatorname{sech}^{-1}(\sqrt{z}); -\pi < \arg(z) \leq 0$$

01.12.27.2202.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{1}{2} \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} \left( \frac{2\sqrt{z-1}\sqrt{z}}{\sqrt{1-z}} \sqrt{\frac{1}{z}} \operatorname{sech}^{-1}(\sqrt{z}) - \pi \sqrt{\frac{1}{z}} \sqrt{z} + \pi \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+a}{z}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$  and  $\operatorname{sech}^{-1}(\sqrt{z})$

01.12.27.2203.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = i \operatorname{sech}^{-1}(\sqrt{z}); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2204.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = -i \operatorname{sech}^{-1}(\sqrt{z}) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0313.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\sqrt{z-1}}{\sqrt{1-z}} \operatorname{sech}^{-1}(\sqrt{z}) /; |\arg(z)| < \pi$$

01.12.27.0314.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{1}{2} \left( 2 \sqrt{\frac{1}{z}} \sqrt{z} \frac{\sqrt{z-1}}{\sqrt{1-z}} \operatorname{sech}^{-1}(\sqrt{z}) - \pi \sqrt{\frac{1}{z}} \sqrt{z} + \pi \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$  and  $\operatorname{sech}^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$

01.12.27.2205.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \frac{\pi}{2} - i \operatorname{sech}^{-1}\left(\sqrt{\frac{z}{z+1}}\right) /; 0 \leq \arg(z) < \pi$$

01.12.27.2206.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \frac{\pi}{2} + i \operatorname{sech}^{-1}\left(\sqrt{\frac{z}{z+1}}\right) /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2207.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = i \operatorname{sech}^{-1}\left(\sqrt{\frac{z}{z+1}}\right) - \frac{\pi}{2} /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.2208.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \frac{1}{2} \sqrt{z} \sqrt{\frac{1}{z}} \sqrt{z+1} \sqrt{\frac{1}{z+1}} \pi - z \sqrt{-\frac{1}{z^2}} \operatorname{sech}^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z+a}}{\sqrt{2z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right)$  and  $\operatorname{sech}^{-1}(z)$

01.12.27.2209.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} (\pi - i \operatorname{sech}^{-1}(z)) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2210.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2} (i \operatorname{sech}^{-1}(z) + \pi) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < -1) \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0319.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2}\left(\pi - \frac{\sqrt{z-1}}{\sqrt{1-z}} \operatorname{sech}^{-1}(z)\right); |\arg(z)| < \pi$$

01.12.27.0320.01

$$\sin^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{2z}}\right) = \frac{1}{2}\sqrt{1+\frac{1}{z}}\sqrt{\frac{z}{z+1}}\left(\pi - \frac{1}{\sqrt{\frac{1}{z}-1}}\sqrt{1-\frac{1}{z}}\operatorname{sech}^{-1}(z)\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right)$  and  $\operatorname{sech}^{-1}(z)$

01.12.27.2211.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right) = \frac{1}{2}i \operatorname{sech}^{-1}(z); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2212.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right) = -\frac{i}{2} \operatorname{sech}^{-1}(z); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1) \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0322.01

$$\sin^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{2z}}\right) = \frac{1}{2\sqrt{\frac{1}{z}-1}}\sqrt{1-\frac{1}{z}}\operatorname{sech}^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{a-z}}{\sqrt{-2z}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-2z}}\right)$  and  $\operatorname{sech}^{-1}(z)$

01.12.27.2213.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-2z}}\right) = \frac{1}{2}\left(\pi - i \operatorname{sech}^{-1}(z)\right); \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2214.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-2z}}\right) = \frac{1}{2}\left(\pi + i \operatorname{sech}^{-1}(z)\right); \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1) \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2215.01

$$\sin^{-1}\left(\frac{\sqrt{-z-1}}{\sqrt{-2z}}\right) = \frac{1}{2}\left(\pi - \frac{1}{\sqrt{\frac{1}{z}-1}}\sqrt{1-\frac{1}{z}}\operatorname{sech}^{-1}(z)\right)$$



Involving  $\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right)$  and  $\operatorname{sech}^{-1}(z)$

01.12.27.2216.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = -\frac{i}{2} \operatorname{sech}^{-1}(z) ; \operatorname{Im}(z) \leq 0$$

01.12.27.2217.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = \frac{i}{2} \operatorname{sech}^{-1}(z) ; \operatorname{Im}(z) > 0$$

01.12.27.2218.01

$$\sin^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-2z}}\right) = -\frac{1}{2} \sqrt{\frac{1}{z}} \sqrt{-z} \operatorname{sech}^{-1}(z)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+a}{2z}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right)$  and  $\operatorname{sech}^{-1}(z)$

01.12.27.2219.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right) = \frac{1}{2} (\pi - i \operatorname{sech}^{-1}(z)) ; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2220.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right) = \frac{1}{2} (i \operatorname{sech}^{-1}(z) + \pi) ; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0) \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0317.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right) = \frac{1}{2} \left( \pi - \frac{\sqrt{z-1}}{\sqrt{1-z}} \operatorname{sech}^{-1}(z) \right) ; |\arg(z)| < \pi$$

01.12.27.0318.01

$$\sin^{-1}\left(\sqrt{\frac{z+1}{2z}}\right) = \frac{1}{2} \left( \pi - \frac{1}{\sqrt{\frac{1}{z} - 1}} \sqrt{1 - \frac{1}{z}} \operatorname{sech}^{-1}(z) \right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right)$  and  $\operatorname{sech}^{-1}(z)$

01.12.27.2221.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right) = \frac{i}{2} \operatorname{sech}^{-1}(z) ; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2222.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right) = -\frac{i}{2} \operatorname{sech}^{-1}(z) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0) \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0321.01

$$\sin^{-1}\left(\sqrt{\frac{z-1}{2z}}\right) = \frac{1}{2\sqrt{\frac{1}{z}-1}} \sqrt{1-\frac{1}{z}} \operatorname{sech}^{-1}(z)$$

### Involving $\sin^{-1}\left(\sqrt{cz^2+1}\right)$

#### Involving $\sin^{-1}\left(\sqrt{z^2+1}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{1+2z^2}\right)$

01.12.27.2223.01

$$\sin^{-1}\left(\sqrt{z^2+1}\right) = \frac{\pi}{2} - \frac{i}{2} \operatorname{sech}^{-1}\left(\frac{1}{1+2z^2}\right) /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\frac{\pi}{2} < \arg(z) \leq 0$$

01.12.27.2224.01

$$\sin^{-1}\left(\sqrt{z^2+1}\right) = \frac{i}{2} \operatorname{sech}^{-1}\left(\frac{1}{1+2z^2}\right) + \frac{\pi}{2} /; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.2225.01

$$\sin^{-1}\left(\sqrt{z^2+1}\right) = \frac{\pi}{2} - \frac{\sqrt{-z^4}}{2z^2} \operatorname{sech}^{-1}\left(\frac{1}{1+2z^2}\right)$$

#### Involving $\sin^{-1}\left(\sqrt{z^2+1}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right)$

01.12.27.2226.01

$$\sin^{-1}\left(\sqrt{z^2+1}\right) = \frac{\pi}{2} - i \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) /; \frac{\pi}{2} < \arg(z) \leq \pi \vee -\frac{\pi}{2} < \arg(z) \leq 0$$

01.12.27.2227.01

$$\sin^{-1}\left(\sqrt{z^2+1}\right) = i \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right) + \frac{\pi}{2} /; 0 < \arg(z) \leq \frac{\pi}{2} \vee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.2228.01

$$\sin^{-1}\left(\sqrt{z^2+1}\right) = \frac{\pi}{2} - \frac{\sqrt{-z^4}}{z^2} \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z^2+1}}\right)$$

#### Involving $\sin^{-1}\left(\sqrt{1-z^2}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.12.27.2229.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = -i \operatorname{sech}^{-1}\left(\frac{1}{z}\right); 0 < \arg(z) \leq \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2230.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = i \operatorname{sech}^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2231.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \pi + i \operatorname{sech}^{-1}\left(\frac{1}{z}\right); \frac{\pi}{2} < \arg(z) \leq \pi$$

01.12.27.2232.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \pi - i \operatorname{sech}^{-1}\left(\frac{1}{z}\right); -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.12.27.0326.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \frac{\sqrt{1-z}}{\sqrt{z-1}} \operatorname{sech}^{-1}\left(\frac{1}{z}\right); -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.0327.01

$$\sin^{-1}\left(\sqrt{1-z^2}\right) = \frac{\sqrt{z^2} \sqrt{1-z}}{z \sqrt{z-1}} \operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2} \left(1 - \frac{\sqrt{z^2}}{z}\right)$$

### Involving $\sin^{-1}\left(\frac{\sqrt{z^2+a}}{z}\right)$

### Involving $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$ and $\operatorname{sech}^{-1}(z)$

01.12.27.2233.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = i \operatorname{sech}^{-1}(z); 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2234.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -i \operatorname{sech}^{-1}(z); -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2235.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = i \operatorname{sech}^{-1}(z) - \pi; \frac{\pi}{2} < \arg(z) < \pi$$

01.12.27.2236.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -i \operatorname{sech}^{-1}(z) - \pi; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.0329.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi}{2}\left(\frac{\sqrt{z^2}}{z}-1\right) + \frac{\sqrt{z-1}}{\sqrt{1-z}} \operatorname{sech}^{-1}(z) ; \operatorname{Re}(z) \neq 0 \wedge |\arg(z)| < \pi$$

01.12.27.0330.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\sqrt{z^2}}{2z}\left(\pi - \pi\sqrt{\frac{1}{z^2}}z + \frac{2\sqrt{z-1}z^{3/2}}{\sqrt{1-z}}\sqrt{\frac{1}{z}}\sqrt{\frac{1}{z^2}}\operatorname{sech}^{-1}(z)\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right)$  and  $\operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right)$

01.12.27.2237.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{1}{2}\left(\pi - i \operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right)\right) ; 0 \leq \arg(z) < \frac{\pi}{2}$$

01.12.27.2238.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{1}{2}\left(i \operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right) + \pi\right) ; -\frac{\pi}{2} < \arg(z) < 0 \vee (iz \in \mathbb{R} \wedge iz < -1) \vee (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.2239.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = -\frac{1}{2}\left(i \operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right) + \pi\right) ; \frac{\pi}{2} < \arg(z) < \pi \vee (-iz \in \mathbb{R} \wedge 0 < -iz < 1) \vee (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.2240.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{1}{2}\left(i \operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right) - \pi\right) ; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2241.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \frac{\sqrt{z^2+1}}{2z\sqrt{-\frac{z^2+1}{z^4}}}\left(\sqrt{\frac{1}{z^2}}\operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right) + \pi\sqrt{-\frac{1}{z^2}}\right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2+a}}{\sqrt{z^2}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$  and  $\operatorname{sech}^{-1}(z)$

01.12.27.2242.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = i \operatorname{sech}^{-1}(z) ; 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2243.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = -i \operatorname{sech}^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2244.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = -i \operatorname{sech}^{-1}(z) + \pi /; \frac{\pi}{2} \leq \arg(z) < \pi$$

01.12.27.2245.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = i \operatorname{sech}^{-1}(z) + \pi /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2246.01

$$\sin^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi}{2} \left(1 - \sqrt{\frac{1}{z^2}} z\right) + \frac{\sqrt{z-1} \sqrt{z}}{\sqrt{\frac{1-z}{z}}} \sqrt{\frac{1}{z^2}} \operatorname{sech}^{-1}(z)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right)$  and  $\operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right)$

01.12.27.2247.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = \frac{\pi}{2} - \frac{1}{2} i \operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right) /; 0 < \arg(z) < \frac{\pi}{2} \bigvee -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2248.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = \frac{\pi}{2} + \frac{1}{2} i \operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0 \bigvee (i z \in \mathbb{R} \wedge i z < -1) \bigvee (i z \in \mathbb{R} \wedge i z > 1)$$

01.12.27.2249.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = -\frac{\pi}{2} - \frac{1}{2} i \operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right) /; (i z \in \mathbb{R} \wedge -1 < i z < 1)$$

01.12.27.2250.01

$$\sin^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = \frac{\sqrt{-z^2(z^2+1)}}{\sqrt{z^2} \sqrt{-z^2-1}} \left( \frac{\pi}{2} - \frac{1}{2} z^2 \sqrt{-\frac{1}{z^4}} \operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{a-z^2}}{\sqrt{-z^2}}\right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$  and  $\operatorname{sech}^{-1}(z)$

01.12.27.2251.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = i \operatorname{sech}^{-1}(z) /; 0 < \arg(z) < \frac{\pi}{2}$$

01.12.27.2252.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -i \operatorname{sech}^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) \leq 0$$

01.12.27.2253.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \pi - i \operatorname{sech}^{-1}(z) /; \frac{\pi}{2} \leq \arg(z) < \pi$$

01.12.27.2254.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = i \operatorname{sech}^{-1}(z) + \pi /; -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2255.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -i \operatorname{sech}^{-1}(z) - \pi /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.2256.01

$$\sin^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \sqrt{\frac{z^2-1}{z^2}} \sqrt{\frac{z^2}{z^2-1}} \left( \frac{\pi}{2} \left( 1 - \sqrt{\frac{1}{z^2}} z \right) + \frac{\sqrt{z-1} \sqrt{z}}{\sqrt{\frac{1-z}{z}}} \sqrt{\frac{1}{z^2}} \operatorname{sech}^{-1}(z) \right)$$

Involving  $\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right)$  and  $\operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right)$

01.12.27.2257.01

$$\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi}{2} - \frac{i}{2} \operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right) /; 0 \leq \arg(z) < \frac{\pi}{2} \vee -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2258.01

$$\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right) = \frac{i}{2} \operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right) + \frac{\pi}{2} /; \frac{\pi}{2} \leq \arg(z) < \pi \vee -\frac{\pi}{2} \leq \arg(z) < 0$$

01.12.27.2259.01

$$\sin^{-1}\left(\frac{\sqrt{-1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi}{2} - \frac{1}{2} \left( z^2 \sqrt{-\frac{1}{z^4}} \right) \operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right)$$

### Involving $\sin^{-1}\left(\sqrt{\frac{z^2+a}{z^2}}\right)$

### Involving $\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$ and $\operatorname{sech}^{-1}(z)$

01.12.27.2260.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = i \operatorname{sech}^{-1}(z) /; 0 < \arg(z) < \frac{\pi}{2} \quad \bigvee \quad (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2261.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = -i \operatorname{sech}^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) < 0 \quad \bigvee \quad (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2262.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \pi - i \operatorname{sech}^{-1}(z) /; \frac{\pi}{2} \leq \arg(z) < \pi$$

01.12.27.2263.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = i \operatorname{sech}^{-1}(z) + \pi /; -\pi < \arg(z) < -\frac{\pi}{2} \quad \bigvee \quad (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2264.01

$$\sin^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi}{2} \left( 1 - \sqrt{\frac{1}{z^2}} z \right) + \frac{\sqrt{z-1} \sqrt{z}}{\sqrt{\frac{1-z}{z}}} \sqrt{\frac{1}{z^2}} \operatorname{sech}^{-1}(z)$$

### Involving $\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right)$

01.12.27.2265.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{1}{2} \left( \pi - i \operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right) \right) /; 0 \leq \arg(z) < \frac{\pi}{2} \quad \bigvee \quad -\pi < \arg(z) < -\frac{\pi}{2} \quad \bigvee \quad (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2266.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{1}{2} \left( i \operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right) + \pi \right) /; \frac{\pi}{2} \leq \arg(z) < \pi \quad \bigvee \quad -\frac{\pi}{2} \leq \arg(z) < 0$$

01.12.27.2267.01

$$\sin^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{\pi}{2} - \frac{1}{2}\left(z^2 \sqrt{-\frac{1}{z^4}}\right) \operatorname{sech}^{-1}\left(\frac{z^2}{z^2+2}\right)$$

### Involving $\sin^{-1}\left(2z\sqrt{1-z^2}\right)$

#### Involving $\sin^{-1}\left(2z\sqrt{1-z^2}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.12.27.2268.01

$$\sin^{-1}\left(2z\sqrt{1-z^2}\right) = \pi + 2i \operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{4} \leq \arg(z) \leq \frac{3\pi}{4}$$

01.12.27.2269.01

$$\sin^{-1}\left(2z\sqrt{1-z^2}\right) = \pi - 2i \operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; -\frac{3\pi}{4} \leq \arg(z) \leq -\frac{\pi}{4}$$

01.12.27.0328.01

$$\sin^{-1}\left(2z\sqrt{1-z^2}\right) = \pi - 2 \frac{\sqrt{1-z}}{\sqrt{z-1}} \operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{4} \leq |\arg(z)| \leq \frac{3\pi}{4}$$

01.12.27.2270.01

$$\begin{aligned} \sin^{-1}\left(2z\sqrt{1-z^2}\right) &= \frac{\pi \sqrt{1-2z^2} \sqrt{z^4-z^2}}{2\sqrt{-z^2} \sqrt{z^2-1} \sqrt{2z^2-1}} \\ &\left( \frac{\sqrt{z^2}}{z} - \sqrt{\frac{1}{z}} \sqrt{z} \sqrt{\frac{1}{\sqrt{2}z+1}} \sqrt{\sqrt{2}z+1} + \sqrt{-\frac{1}{z}} \sqrt{-z} \sqrt{\frac{1}{1-\sqrt{2}z}} \sqrt{1-\sqrt{2}z} + \frac{\sqrt{z^4-z^2}}{z\sqrt{z^2-1}} - 2 \right) + \\ &\frac{2\sqrt{1-z} \sqrt{1-2z^2} \sqrt{z^4-z^2}}{\sqrt{z-1} \sqrt{-z^2} \sqrt{z^2-1} \sqrt{2z^2-1}} \operatorname{sech}^{-1}\left(\frac{1}{z}\right) \end{aligned}$$

### Involving $\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right)$

#### Involving $\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right)$ and $\operatorname{sech}^{-1}(z)$

01.12.27.2271.01

$$\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = \frac{\sqrt{z^2} \pi}{z} - \frac{2\sqrt{z^2} \sqrt{z-1}}{z\sqrt{1-z}} \operatorname{sech}^{-1}(z) /; |z| > \sqrt{2} \wedge \operatorname{Im}(z) \neq 0$$



01.12.27.2272.01

$$\sin^{-1}\left(\frac{2\sqrt{z^2-1}}{z^2}\right) = -\frac{z^3\sqrt{z^2-2}\sqrt{z^2-1}}{2\sqrt{1-z}(z+1)\sqrt{-z^4+3z^2-2}}\sqrt{\frac{1-z^2}{z^4}}\sqrt{\frac{1}{z}}$$

$$\sqrt{-\frac{z+1}{z}}\left(\pi\left(\frac{z^3}{1-z^2}\sqrt{\frac{1-z^2}{z^2}}\sqrt{\frac{1-z^2}{z^4}}+\sqrt{\frac{1}{z^2}}z-\sqrt{\frac{1}{z}}\sqrt{\frac{z}{z+\sqrt{2}}}\sqrt{\frac{z+\sqrt{2}}{z}}\sqrt{z}+\right.\right.$$

$$\left.\left.\sqrt{1-\frac{\sqrt{2}}{z}}\sqrt{-\frac{1}{z}}\sqrt{-z}\sqrt{\frac{z}{z-\sqrt{2}}}-2\right)+\frac{4}{\sqrt{\frac{1}{z}-1}}\sqrt{1-\frac{1}{z}}\operatorname{sech}^{-1}(z)\right)$$

Involving  $\sin^{-1}\left(\sqrt{\left(1-\sqrt{1+cz^2}\right)/2}\right)$

Involving  $\sin^{-1}\left(\sqrt{\left(1-\sqrt{1+z^2}\right)/2}\right)$  and  $\operatorname{sech}^{-1}\left(-\frac{i}{z}\right)$

01.12.27.2273.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{z^2+1}\right)}\right) = -\frac{1}{2}i\operatorname{sech}^{-1}\left(-\frac{i}{z}\right)-\frac{\pi}{4}; 0 < \arg(z) \leq \frac{\pi}{2}$$

01.12.27.2274.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{z^2+1}\right)}\right) = \frac{i}{2}\operatorname{sech}^{-1}\left(-\frac{i}{z}\right)+\frac{\pi}{4}; -\frac{\pi}{2} < \arg(z) \leq 0 \vee (iz \in \mathbb{R} \wedge 0 < iz < 1)$$

01.12.27.2275.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{z^2+1}\right)}\right) = \frac{i}{2}\operatorname{sech}^{-1}\left(-\frac{i}{z}\right)-\frac{\pi}{4}; \frac{\pi}{2} < \arg(z) \leq \pi$$

01.12.27.2276.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{z^2+1}\right)}\right) = \frac{\pi}{4}-\frac{i}{2}\operatorname{sech}^{-1}\left(-\frac{i}{z}\right); -\pi < \arg(z) < -\frac{\pi}{2} \vee (iz \in \mathbb{R} \wedge iz > 1)$$

01.12.27.0331.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1+z^2}}{2}}\right) = \frac{\pi}{4}-\frac{\sqrt{1-iz}}{2\sqrt{iz-1}}\operatorname{sech}^{-1}\left(-\frac{i}{z}\right); -\pi < \arg(z) \leq 0$$

01.12.27.2277.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{z^2+1}\right)}\right)=\frac{i\sqrt{-z^2}}{z}\left(\frac{\sqrt{1-iz}}{2\sqrt{iz-1}}\operatorname{sech}^{-1}\left(\frac{i}{z}\right)-\frac{\pi}{4}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2}}\right)$  and  $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.12.27.2278.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{1-z^2}\right)}\right)=\frac{1}{2}\left(i\operatorname{sech}^{-1}\left(\frac{1}{z}\right)+\frac{\pi}{2}\right); 0<\arg(z)\leq\frac{\pi}{2}\vee(z\in\mathbb{R}\wedge 0<z<1)$$

01.12.27.2279.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{1-z^2}\right)}\right)=\frac{1}{2}\left(\frac{\pi}{2}-i\operatorname{sech}^{-1}\left(\frac{1}{z}\right)\right); -\frac{\pi}{2}<\arg(z)<0\vee(z\in\mathbb{R}\wedge z>1)$$

01.12.27.2280.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{1-z^2}\right)}\right)=-\frac{1}{2}\left(i\operatorname{sech}^{-1}\left(\frac{1}{z}\right)+\frac{\pi}{2}\right); \frac{\pi}{2}<\arg(z)\leq\pi$$

01.12.27.2281.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{1-z^2}\right)}\right)=\frac{1}{2}\left(i\operatorname{sech}^{-1}\left(\frac{1}{z}\right)-\frac{\pi}{2}\right); -\pi<\arg(z)\leq-\frac{\pi}{2}$$

01.12.27.0332.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2}}\right)=\frac{1}{2}\left(\frac{\pi}{2}-\frac{\sqrt{1-z}}{\sqrt{z-1}}\operatorname{sech}^{-1}\left(\frac{1}{z}\right)\right); -\frac{\pi}{2}<\arg(z)\leq\frac{\pi}{2}$$

01.12.27.2282.01

$$\sin^{-1}\left(\sqrt{\frac{1}{2}\left(1-\sqrt{1-z^2}\right)}\right)=\frac{1}{2}\left(\frac{\sqrt{1-z}}{\sqrt{z-1}}\operatorname{sech}^{-1}\left(\frac{1}{z}\right)-\frac{\pi}{2}\right); \operatorname{Re}(z)<0\vee\arg(z)=-\frac{\pi}{2}$$

01.12.27.0333.01

$$\sin^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2}}\right)=\frac{\sqrt{z^2}}{2z}\left(\frac{\pi}{2}-\frac{\sqrt{1-z}}{\sqrt{z-1}}\operatorname{sech}^{-1}\left(\frac{1}{z}\right)\right)$$

Involving  $\sin^{-1}\left(z\sqrt{\frac{1-\sqrt{1-z^2}}{2z^2}}\right)$

Involving  $\sin^{-1}\left(z\sqrt{\frac{1-\sqrt{1-z^2}}{2z^2}}\right)$  and  $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.12.27.2283.01

$$\sin^{-1} \left( \frac{z \sqrt{1 - \sqrt{1 - z^2}}}{\sqrt{2 z^2}} \right) = \frac{1}{2} \left( i \operatorname{sech}^{-1} \left( \frac{1}{z} \right) + \frac{\pi}{2} \right) /; 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2284.01

$$\sin^{-1} \left( \frac{z \sqrt{1 - \sqrt{1 - z^2}}}{\sqrt{2 z^2}} \right) = \frac{1}{2} \left( \frac{\pi}{2} - i \operatorname{sech}^{-1} \left( \frac{1}{z} \right) \right) /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.0334.01

$$\sin^{-1} \left( \frac{z \sqrt{1 - \sqrt{1 - z^2}}}{\sqrt{2 z^2}} \right) = \frac{1}{2} \left( \frac{\pi}{2} - \frac{\sqrt{1 - z}}{\sqrt{z - 1}} \operatorname{sech}^{-1} \left( \frac{1}{z} \right) \right)$$

Involving  $\sin^{-1} \left( z \sqrt{(1 - \sqrt{1 - z^2}) / (2 z^2)} \right)$

Involving  $\sin^{-1} \left( z \sqrt{(1 - \sqrt{1 - z^2}) / (2 z^2)} \right)$  and  $\operatorname{sech}^{-1} \left( \frac{1}{z} \right)$

01.12.27.2285.01

$$\sin^{-1} \left( z \sqrt{\frac{1 - \sqrt{1 - z^2}}{2 z^2}} \right) = \frac{1}{2} \left( i \operatorname{sech}^{-1} \left( \frac{1}{z} \right) + \frac{\pi}{2} \right) /; 0 < \arg(z) \leq \pi \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.12.27.2286.01

$$\sin^{-1} \left( z \sqrt{\frac{1 - \sqrt{1 - z^2}}{2 z^2}} \right) = \frac{1}{2} \left( \frac{\pi}{2} - i \operatorname{sech}^{-1} \left( \frac{1}{z} \right) \right) /; -\pi < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2287.01

$$\sin^{-1} \left( z \sqrt{\frac{1 - \sqrt{1 - z^2}}{2 z^2}} \right) = \frac{1}{2} \left( \frac{\pi}{2} - \frac{\sqrt{1 - z}}{\sqrt{z - 1}} \operatorname{sech}^{-1} \left( \frac{1}{z} \right) \right)$$

Involving  $\sin^{-1} \left( \sqrt{z - \sqrt{z^2 - 1}} / \sqrt{2 z} \right)$

Involving  $\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right)$  and  $\operatorname{sech}^{-1}(z)$

01.12.27.2288.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = \frac{1}{2}\left(\frac{\pi}{2} - i \operatorname{sech}^{-1}(z)\right); 0 < \arg(z) \leq \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1) \vee \arg(z) = -\frac{\pi}{2}$$

01.12.27.2289.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = \frac{1}{2}\left(i \operatorname{sech}^{-1}(z) + \frac{\pi}{2}\right); -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2290.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = \frac{1}{2}\left(\frac{3\pi}{2} - i \operatorname{sech}^{-1}(z)\right); \frac{\pi}{2} < \arg(z) < \pi$$

01.12.27.2291.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = \frac{1}{2}\left(i \operatorname{sech}^{-1}(z) + \frac{3\pi}{2}\right); -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < -1)$$

01.12.27.2292.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) = -\frac{1}{2}\left(i \operatorname{sech}^{-1}(z) + \frac{3\pi}{2}\right); (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.12.27.2293.01

$$\sin^{-1}\left(\frac{\sqrt{z - \sqrt{z^2 - 1}}}{\sqrt{2z}}\right) =$$

$$\frac{\sqrt{z-1} \sqrt{-iz} \sqrt{z}}{2\sqrt{\frac{1}{z}-1}} \sqrt{\frac{i}{z}} \sqrt{-\frac{1}{z+1}} \sqrt{-\frac{z+1}{z^2}} \operatorname{sech}^{-1}(z) - \frac{1}{4}\pi \sqrt{-\frac{1}{z+1}} \sqrt{-\frac{z+1}{z^2}} \left(\sqrt{\frac{i}{z}} \sqrt{-iz} z + z - \sqrt{z^2}\right)$$

Involving  $\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right)$

Involving  $\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right)$  and  $\operatorname{sech}^{-1}(z)$

01.12.27.2294.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2}\left(\frac{\pi}{2} - i \operatorname{sech}^{-1}(z)\right); 0 < \arg(z) < \frac{\pi}{2} \vee (z \in \mathbb{R} \wedge 0 < z < 1) \vee \arg(z) = -\frac{\pi}{2}$$

01.12.27.2295.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2}\left(i \operatorname{sech}^{-1}(z) + \frac{\pi}{2}\right); -\frac{\pi}{2} < \arg(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.12.27.2296.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2}\left(\frac{3\pi}{2} - i \operatorname{sech}^{-1}(z)\right); \frac{\pi}{2} < \arg(z) < \pi$$

01.12.27.2297.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{1}{2}\left(i \operatorname{sech}^{-1}(z) + \frac{3\pi}{2}\right); -\pi < \arg(z) < -\frac{\pi}{2} \vee (z \in \mathbb{R} \wedge z < 0)$$

01.12.27.2298.01

$$\sin^{-1}\left(\sqrt{\frac{z - \sqrt{z^2 - 1}}{2z}}\right) = \frac{z \sqrt{z^2} \sqrt{z-1} \sqrt{z+1}}{2 \sqrt{1-z}} \sqrt{\frac{1}{z^2}} \sqrt{-\frac{1}{(z+1)^2}} \sqrt{-\frac{z+1}{z^2}} \operatorname{sech}^{-1}(z) -$$

$$\frac{1}{4} \pi \sqrt{\frac{1}{z}} \sqrt{z} \sqrt{-\frac{1}{(z+1)^2}} \sqrt{z+1} \sqrt{-\frac{z+1}{z^2}} \sqrt{iz} \sqrt{-\frac{i}{z}} \left(\sqrt{\frac{i}{z}} \sqrt{-iz} z + z - \sqrt{z^2}\right)$$

## Inequalities

01.12.29.0001.01

$$|\sin^{-1}(x)| \leq \frac{\pi}{2}; |x| \leq 1 \wedge x \in \mathbb{R}$$

## Zeros

01.12.30.0001.01

$$\sin^{-1}(z) = 0; z = 0$$

## History

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- I. Newton (1699) found a series representation for arcsin
- J. Bernoulli (1702) used "arc" in arcSin
- J. Herschel (1813) introduced the notation  $\sin^{-1}$

The function  $\sin^{-1}$  is encountered often in mathematics and the natural sciences.

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