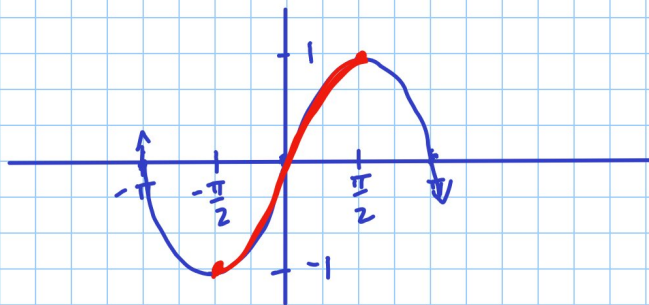


Section 6.1 Inverse Sine, Cosine, and Tangent



Inverse Sine

$\sin^{-1}x$ is asking for the angle between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$ whose sine is x

$$\sin^{-1} \frac{\sqrt{2}}{2} = \frac{\pi}{4}$$

Inverse Cosine

$\cos^{-1}x$ is asking for the angle between 0 and π whose cosine is x

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

Inverse Tangent

$\tan^{-1}x$ is asking for the angle between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$ whose tangent is x

$$\tan^{-1}(-\sqrt{3}) = -\frac{\pi}{3}$$

sine

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

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

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

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

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

$$\sin^{-1}\frac{1}{2} = \frac{\pi}{6}$$

$$\sin^{-1}\frac{\sqrt{2}}{2} = \frac{\pi}{4}$$

$$\sin^{-1}\frac{\sqrt{3}}{2} = \frac{\pi}{3}$$

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

cosine

$$\cos^{-1}(-1) = \pi$$

$$\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \frac{5\pi}{6}$$

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

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

$$\cos^{-1}0 = \frac{\pi}{2}$$

$$\cos^{-1}\frac{1}{2} = \frac{\pi}{3}$$

$$\cos^{-1}\frac{\sqrt{2}}{2} = \frac{\pi}{4}$$

$$\cos^{-1}\frac{\sqrt{3}}{2} = \frac{\pi}{6}$$

$$\cos^{-1}1 = 0$$

tangent

$$\tan^{-1}(-\sqrt{3}) = -\frac{\pi}{3}$$

$$\tan^{-1}(-1) = -\frac{\pi}{4}$$

$$\tan^{-1}\left(-\frac{\sqrt{3}}{3}\right) = -\frac{\pi}{6}$$

$$\tan^{-1}0 = 0$$

$$\tan^{-1}\frac{\sqrt{3}}{3} = \frac{\pi}{6}$$

$$\tan^{-1}1 = \frac{\pi}{4}$$

$$\tan^{-1}\sqrt{3} = \frac{\pi}{3}$$

ex: $\cos\left(\underbrace{\cos^{-1}\frac{\sqrt{2}}{2}}_{\text{today's chart}}\right) = \cos\frac{\pi}{4} = \frac{\sqrt{2}}{2}$

$$\tan(\tan^{-1} 1000) = 1000$$

$$\sin\left(\sin^{-1}\frac{14}{15}\right) = \frac{14}{15}$$

If sin, cos, or tan are on the outside of \sin^{-1} , \cos^{-1} , or \tan^{-1} the functions cancel.

$\sin(\sin^{-1} 6)$ = undefined for sin and cos if number is > 1 or < -1 answer is undefined.

When inverse is on the outside, evaluated the inside first.

$$\cos^{-1}\left(\underbrace{\cos\frac{11\pi}{6}}_{\text{CHART}}\right) = \cos^{-1}\underbrace{\frac{\sqrt{3}}{2}}_{\text{SHART}} = \frac{\pi}{6}$$

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

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For calculator problems, put calculator in radian mode

$$29) \tan(\tan^{-1}(-3.5)) = -3.5$$