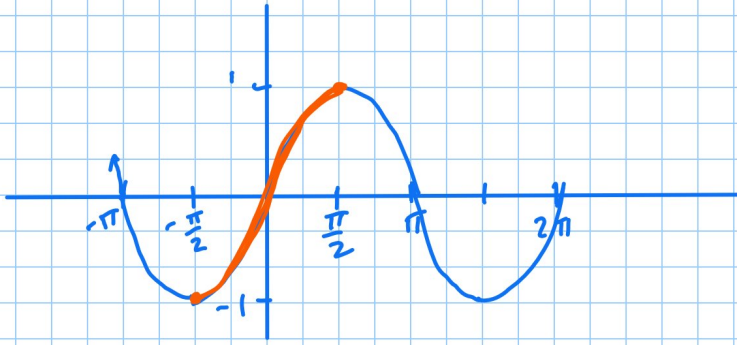


# Section 6.1 Inverse Sine, Cosine, and Tangent



## 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  $\pi$  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:  $\cos\left(\underbrace{\cos^{-1}\frac{\sqrt{2}}{2}}_{\text{today's chart}}\right) = \underbrace{\cos\frac{\pi}{4}}_{\text{Ch 5 Chart}} = \frac{\sqrt{2}}{2}$

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

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

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

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

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

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For calculator problems, put your calculator in radian mode