

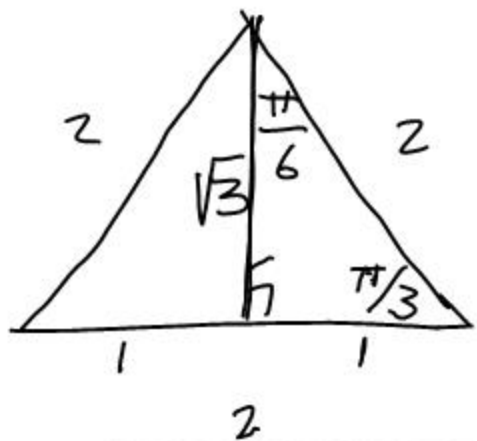
Inverse Trig Functions

$$\text{Ex. } \sin \frac{\pi}{6} = \frac{1}{2}$$

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

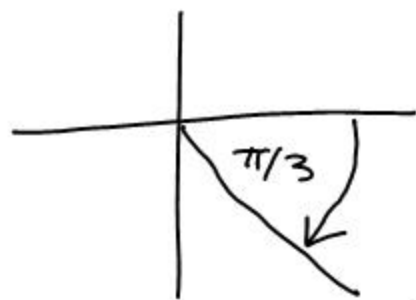
↖
inverse sine
(not the reciprocal)

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

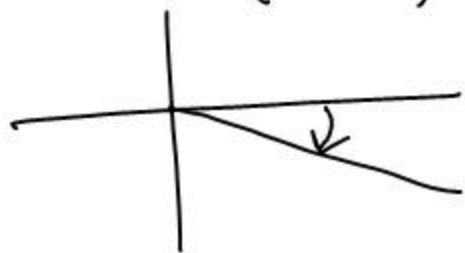


$$\text{Ex. } \tan^{-1} \sqrt{3} = \frac{\pi}{3}$$

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



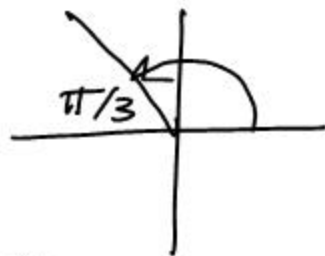
$$\text{Ex. } \tan^{-1} \left(-\frac{1}{\sqrt{3}} \right) = -\frac{\pi}{6}$$



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

↑
negative

↑
quadrant II

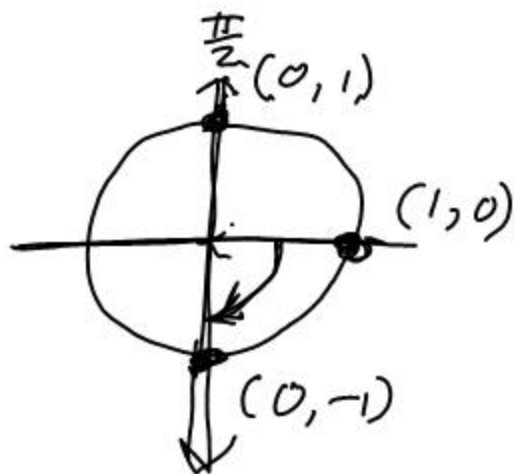


$$\cos^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{3}$$

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

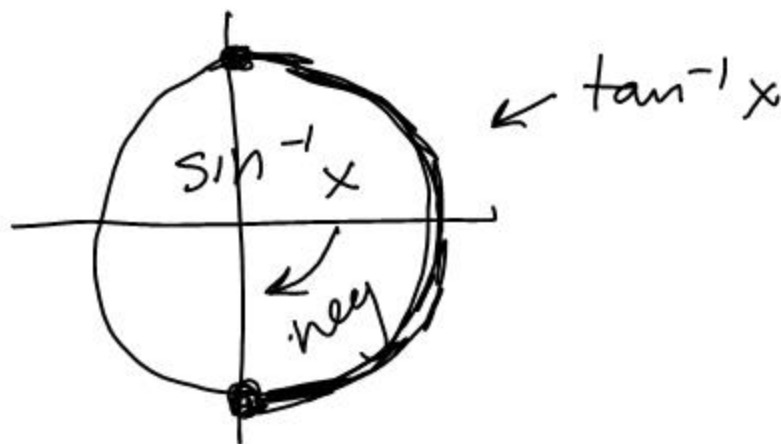
$$\text{Ex. } \sin^{-1}(1) = \frac{\pi}{2}$$

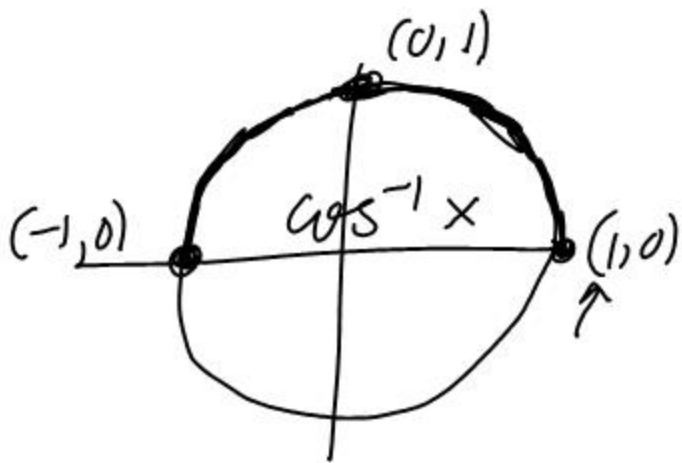
$$\text{Ex. } \sin^{-1}(-1) = -\frac{\pi}{2}$$



$$\sin^{-1}\left(\frac{1}{2}\right) = \cancel{\frac{5\pi}{6}}$$

$$\sin \frac{5\pi}{6} = \frac{1}{2}$$





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

$$\cos^{-1}(1) = 0 \leftarrow$$

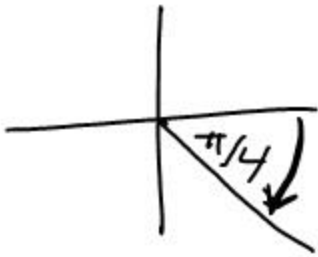
$$\cos^{-1}(-1) = \pi$$

$$\cos^{-1} x \geq 0$$

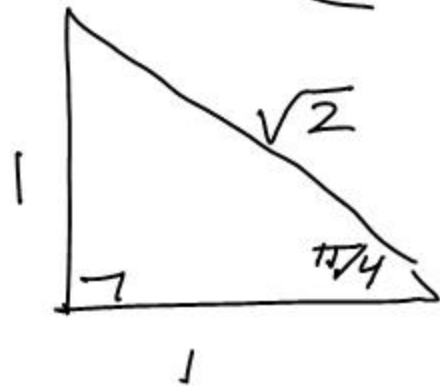
Ex. $\sin^{-1}\left(\sin \frac{5\pi}{4}\right)$ ↙ 2nd III

↘ same ref. angle

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

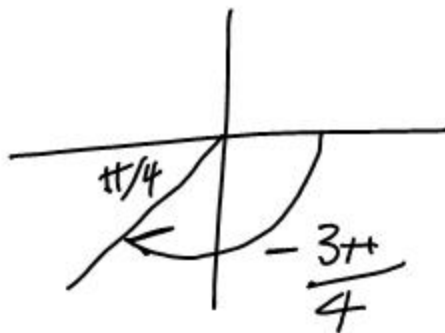


$$\ln(e^5) = 5$$



Ex. $\cos^{-1} \left(\cos \left(-\frac{3\pi}{4} \right) \right)$ quadrant III
ref. angle $\frac{\pi}{4}$

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



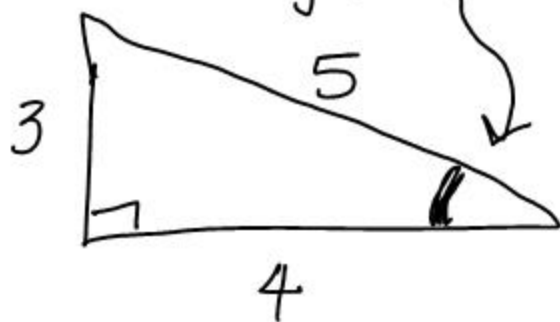
ref angle: $\frac{\pi}{4}$

Ex. $\tan^{-1} \left(\tan \left(-\frac{\pi}{6} \right) \right)$

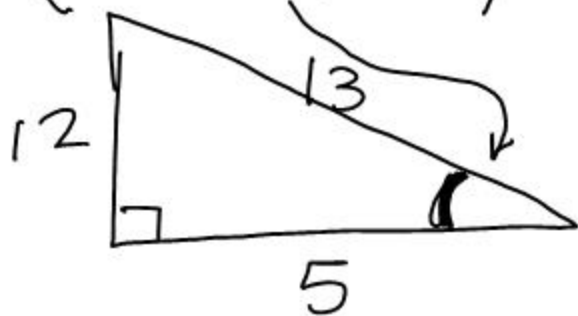
$$= \tan^{-1} \left(-\frac{1}{\sqrt{3}} \right)$$

$$= -\frac{\pi}{6}$$

$$\text{Ex. } \cos \left(\underbrace{\sin^{-1} \left(\frac{3}{5} \right)}_{\text{angle}} \right) = \frac{4}{5}$$



$$\text{Ex. } \underline{\sec} \left(\tan^{-1} \left(\frac{12}{5} \right) \right) = \frac{13}{5}$$



$$\text{Ex. } \sin \left(\underbrace{\cos^{-1} \left(\frac{9}{41} \right)}_{\text{angle}} \right) = \frac{40}{41}$$

