

Determining Exact Values

↳ Determine quadrant

↳ Find ratio

$$\begin{array}{c|c} S & A \\ \hline T & C \end{array}$$

Example #3Determine the **exact** value of the following trigonometric ratios.

a) $\cos \frac{\pi}{3} = \frac{1}{2}$

$$\begin{aligned} \text{b) } \sec \frac{\pi}{3} &= \frac{1}{\cos \frac{\pi}{3}} \\ &= \frac{1}{\frac{1}{2}} \\ &= 2 \end{aligned}$$

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

d) $\cos \frac{7\pi}{4} = \frac{\sqrt{2}}{2}$

$$\begin{aligned} \text{e) } \cot(270^\circ) &= \frac{1}{\tan(270^\circ)} \\ &= \frac{0}{-1} \\ &= 0 \end{aligned}$$

$$\begin{aligned} \text{f) } \csc \left(\frac{2\pi}{3}\right) &= \frac{1}{\frac{\sqrt{3}}{2}} \\ &= \frac{2}{\sqrt{3}} \end{aligned}$$

$$\begin{aligned} \text{g) } \tan \frac{11\pi}{4} &= \frac{\sin \frac{11\pi}{4}}{\cos \frac{11\pi}{4}} \\ &= \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} \\ &= 1 \end{aligned}$$

$$\begin{aligned} \text{h) } \sec 5\pi &= \frac{1}{-1} \\ &= -1 \end{aligned}$$

Example #4Determine the **exact** value of the following expressions.

a) $\cos(120^\circ) - \tan(-135^\circ)$

$$= -\frac{1}{2} - 1$$

$$= -\frac{1}{2} - \frac{2}{2}$$

$$= -\frac{3}{2}$$

b) $\cot\left(-\frac{3\pi}{4}\right) + \csc\left(\frac{\pi}{2}\right)$

$$= 1 + 1$$

$$= 2$$

c) $\sin^2\left(\frac{7\pi}{6}\right) + \cos^2\left(\frac{7\pi}{6}\right)$

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

$$= \frac{1}{4} + \frac{3}{4}$$

$$= \frac{4}{4}$$

$$= 1$$

d) $\tan^2\left(\frac{-\pi}{3}\right) \sec\left(\frac{4\pi}{3}\right)$

$$= (-\sqrt{3})^2 (-2)$$

$$= (3)(-2)$$

$$= -6$$