

Practice #14 Alg 2 Unit Circle-Reciprocal Trig Functions Thursday, April 2, 2020

Find the EXACT value of each using the Unit Circle. You can find a copy of the Unit Circle on my blog post for today. Give answer in simplified radical form with rationalized denominators.

1. $\csc 120^\circ$

2. $\sec \frac{5\pi}{3}$

3. $\cot \frac{3\pi}{2}$

4. $\csc \frac{19\pi}{6}$

5. $\sec(-585^\circ)$

6. $\cot 690^\circ$

Use the given information to find the unknown angle or unknown value of the trig function.

7. Given $\sin \theta = \frac{-1}{2}$ and $\cos \theta < 0$, find θ

8. Given $\cos \theta = \frac{-\sqrt{2}}{2}$ and $\pi \leq \theta \leq \frac{3\pi}{2}$ find $\tan \theta$

Practice #14 Alg 2 Unit Circle-Reciprocal Trig Functions Thursday, April 2, 2020

Find the EXACT value of each using the Unit Circle. You can find a copy of the Unit Circle on my blog post for today. Give answer in simplified radical form with rationalized denominators.

$$1. \csc 120^\circ = \frac{1}{\sin 120^\circ} = \frac{1}{\text{y-coord at } 120^\circ}$$

$$= \frac{1}{\frac{\sqrt{3}}{2}} = \frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$$

$$\boxed{\csc 120^\circ = \frac{2\sqrt{3}}{3}}$$

$$2. \sec \frac{5\pi}{3} = \frac{1}{\cos \frac{5\pi}{3}} = \frac{1}{\text{x-coord at } \frac{5\pi}{3}}$$

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

$$\boxed{\sec \frac{5\pi}{3} = 2}$$

$$3. \cot \frac{3\pi}{2} = \frac{1}{\tan \frac{3\pi}{2}} = \frac{\frac{1}{y}}{\frac{x}{y}}$$

$$= \frac{0}{-1} = 0$$

$$\boxed{\cot \frac{3\pi}{2} = 0}$$

$$4. \csc \frac{19\pi}{6} \quad 2\pi = \frac{12\pi}{6}$$

$$\frac{19\pi}{6} - \frac{12\pi}{6} = \frac{7\pi}{6}$$

$$\csc \frac{19\pi}{6} = \csc \frac{7\pi}{6} = \frac{1}{\sin \frac{7\pi}{6}}$$

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

$$\boxed{\csc \frac{19\pi}{6} = -2}$$

$$5. \sec(-585^\circ)$$

$$-585^\circ + 720^\circ = 135^\circ$$

$$\sec(-585^\circ) = \sec 135^\circ = \frac{1}{\cos 135^\circ}$$

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

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

$$\boxed{\sec(-585^\circ) = -\sqrt{2}}$$

$$6. \cot 690^\circ$$

$$690^\circ - 360^\circ = 330^\circ$$

$$\cot 690^\circ = \cot 330^\circ$$

$$= \frac{1}{\tan 330^\circ} = \frac{x}{y}$$

$$= \frac{\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = -\sqrt{3}$$

$$\boxed{\cot 690^\circ = -\sqrt{3}}$$

Use the given information to find the unknown angle or unknown value of the trig function.

$$7. \text{ Given } \sin \theta = -\frac{1}{2} \text{ and } \cos \theta < 0, \text{ find } \theta$$

$$\begin{aligned} \textcircled{1} \quad \sin \theta = -\frac{1}{2} &\Rightarrow \sin \theta \text{ is neg in Quad } \textcircled{\text{III}} \text{ \& } \textcircled{\text{IV}} \\ \cos \theta < 0 &\Rightarrow \cos \theta \text{ is neg in Quad } \textcircled{\text{II}} \text{ \& } \textcircled{\text{III}} \end{aligned} \quad \left. \vphantom{\begin{aligned} \sin \theta = -\frac{1}{2} \\ \cos \theta < 0 \end{aligned}} \right\} \begin{array}{l} \text{for both to be} \\ \text{true } \theta \\ \text{must be in} \\ \text{Quad } \textcircled{\text{III}} \end{array}$$

$$\textcircled{2} \quad \sin \theta = -\frac{1}{2} \text{ when y-coord} = -\frac{1}{2}$$

$$y = -\frac{1}{2} \text{ in Quad } \textcircled{\text{III}} \text{ at } 210^\circ \Rightarrow$$

$$\boxed{\theta = 210^\circ}$$

$$8. \text{ Given } \cos \theta = \frac{-\sqrt{2}}{2} \text{ and } \pi \leq \theta \leq \frac{3\pi}{2} \text{ find } \tan \theta$$

$$\bullet \quad \pi \leq \theta \leq \frac{3\pi}{2} \Rightarrow \text{Quad } \textcircled{\text{III}}$$

$$\bullet \quad \cos \theta = \frac{-\sqrt{2}}{2} \text{ when } x = \frac{-\sqrt{2}}{2}$$

$$\bullet \quad x = \frac{-\sqrt{2}}{2} \text{ in Quad } \textcircled{\text{III}} \text{ at } 225^\circ \Rightarrow \theta = 225^\circ$$

$$\bullet \quad \tan \theta = \tan 225^\circ = \frac{y}{x} = \frac{\frac{-\sqrt{2}}{2}}{\frac{-\sqrt{2}}{2}} = 1$$

$$\boxed{\tan \theta = 1}$$