



Assignment 7B: Angles and Arcs

Answer the following problems with as much detail, explanation, and work that is appropriate.

1. If $\cos(\theta) = \frac{1}{5}$, and θ is in quadrant I, find $\sin(\theta)$, $\sec(\theta)$, $\csc(\theta)$, $\tan(\theta)$, $\cot(\theta)$

$$\text{adj} = 1, \text{hyp} = 5, \text{opp} = 2\sqrt{6}$$

$$\sin(\theta) = \frac{2\sqrt{6}}{5}, \cos(\theta) = \frac{1}{5}, \tan(\theta) = 2\sqrt{6}, \sec(\theta) = 5, \csc(\theta) = \frac{5}{2\sqrt{6}}, \cot(\theta) = \frac{1}{2\sqrt{6}}$$

2. If $\tan(\theta) = 4$, and $0 \leq \theta < \frac{\pi}{2}$, find $\sin(\theta)$, $\cos(\theta)$, $\sec(\theta)$, $\csc(\theta)$, $\cot(\theta)$

$$\text{opp} = 4, \text{adj} = 1, \text{hyp} = \sqrt{17}$$

$$\sin(\theta) = \frac{4}{\sqrt{17}}, \cos(\theta) = \frac{1}{\sqrt{17}}, \tan(\theta) = 4, \sec(\theta) = \sqrt{17}, \csc(\theta) = \frac{\sqrt{17}}{4}, \cot(\theta) = \frac{1}{4}$$

Simplify each of the following to an expression involving a single trig function with no fractions. To do this, it may help to rewrite each trig. function in terms of *opposite*, *adjacent*, and *hypotenuse*.

1. $\csc(t) \tan(t)$

$$\frac{\text{hyp}}{\text{opp}} \cdot \frac{\text{opp}}{\text{adj}} = \frac{\text{hyp}}{\text{adj}} = \sec(t)$$

2. $\cos(t) \csc(t)$

$$\frac{\text{adj}}{\text{hyp}} \cdot \frac{\text{hyp}}{\text{opp}} = \frac{\text{adj}}{\text{opp}} = \cot(t)$$

3. $\frac{\sec(t)}{\csc(t)}$

$$\frac{\frac{\text{hyp}}{\text{adj}}}{\frac{\text{hyp}}{\text{opp}}} \cdot \frac{\text{opp}}{\text{hyp}} = \frac{\text{opp}}{\text{adj}} = \tan(t)$$

4. $\frac{\cot(t)}{\csc(t)}$

$$\frac{\frac{\text{adj}}{\text{opp}}}{\frac{\text{hyp}}{\text{opp}}} \cdot \frac{\text{opp}}{\text{hyp}} = \frac{\text{adj}}{\text{hyp}} = \cos(t)$$

Go Beyond:

