

Math 1613 - Trigonometry

Quiz #15 - 2018.10.15

Solutions

Find $\sin(\theta)$ if $\cot(\theta) = -\frac{1}{3}$ and $\cos(\theta) > 0$.

First, $\cot(\theta)$ is negative in quadrants II and IV, and $\cos(\theta) > 0$ for quadrants I and IV. Thus, we are looking at quadrant IV, for which sine and cosecant are negative. As such, we can use the identity

$$1 + \cot^2(\theta) = \csc^2(\theta)$$

and solve for $\csc(\theta)$:

$$\csc(\theta) = -\sqrt{1 + \cot^2(\theta)}$$

Plugging in $\cot(\theta) = -\frac{1}{3}$ gives

$$\csc(\theta) = -\sqrt{\frac{10}{9}} = -\frac{\sqrt{10}}{3}$$

Since cosecant and sine are reciprocal functions, we have

$$\sin(\theta) = \frac{1}{\csc(\theta)} = -\frac{3}{\sqrt{10}}$$