

Quiz 3

Key

Math 1060–5

Friday, September 14, 2012

Directions: Show all work for full credit. Clearly indicate all answers. Simplify all mathematical expressions completely. No calculators are allowed.

1. Consider the angle $\theta = \frac{11\pi}{3}$. (6 points each)

(a) Find the reference angle, θ' .

The reference angle is the angle between θ and the horizontal axis, which is $\theta' = 4\pi - \frac{11\pi}{3} = \frac{\pi}{3}$.

(b) Using your answer to (1a), find $\sin \theta$ and $\cos \theta$.

$$\sin \frac{11\pi}{3} = -\sin \frac{\pi}{3} = -\frac{\sqrt{3}}{2}$$

$$\cos \frac{11\pi}{3} = \cos \frac{\pi}{3} = \frac{1}{2}$$

We know that sine is negative and cosine is positive because θ is in the fourth quadrant.

2. Given an angle θ in Quadrant II such that $\sin \theta = \frac{3}{5}$, find the values of the six trigonometric functions of θ . (14 points)

Using that $\sin^2 \theta + \cos^2 \theta = 1$, we can find cosine

$$\cos^2 \theta = 1 - \sin^2 \theta$$

$$\cos^2 \theta = 1 - \left(\frac{3}{5}\right)^2 = 1 - \frac{9}{25} = \frac{16}{25}$$

$$\cos \theta = \pm \sqrt{\frac{16}{25}} = -\frac{4}{5} \quad (\text{We need negative because cosine is negative in Quadrant II})$$

Using reciprocals and that $\tan \theta = \sin \theta / \cos \theta$, we get:

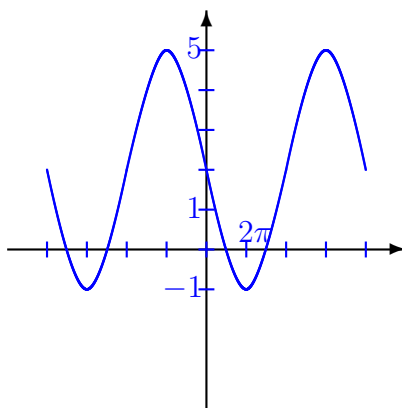
$$\begin{array}{ll} \sin \theta = \frac{3}{5} & \csc \theta = \frac{5}{3} \\ \cos \theta = -\frac{4}{5} & \sec \theta = -\frac{5}{4} \\ \tan \theta = -\frac{3}{4} & \cot \theta = -\frac{4}{3} \end{array}$$

3. Find the amplitude and period of, and graph each of the following trigonometric functions. Include at least two periods for each graph. (12 points each)

(a) $y = -3 \sin\left(\frac{x}{4}\right) + 2$

Amplitude = $|-3| = 3$

Period = $\frac{2\pi}{1/4} = 8\pi$



(b) $y = \frac{1}{3} \cos x$ (#37 from 4.5)

Amplitude = $\frac{1}{3}$

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

