**12/2**

**Lesson 5-2: Trigonometric Functions of Real Numbers**

**Objectives**
Students will…
- Be able to know that the coordinates of radians, $(x, y) = (\cos t, \sin t)$
- Be able to evaluate trigonometric functions in radians.

**Trigonometric Functions**
The concept of trigonometric functions can be defined in terms of the unit circle. The **definition of trigonometric functions** is as follows:

$$\cos t = x \qquad\qquad \sin t = y \qquad\qquad \tan t = \frac{y}{x} \ (x \neq 0)$$

$$\sec t = \frac{1}{\cos t} = \qquad\qquad \csc t = \frac{1}{\sin t} = \qquad\qquad \cot t = \frac{1}{\tan t} =$$
$$(x \neq 0) \qquad\qquad\qquad (y \neq 0) \qquad\qquad\qquad (y \neq 0)$$

**Evaluating Trigonometric Functions**
We have computed the $(x, y)$ coordinate for each of the values on the unit circle. Based on our definition above, $(x, y) = (\cos t, \sin t)$. Consider the following units on the unit circle (Note that we are in **radians**):

$0 = (1, 0) \qquad \rightarrow \qquad \cos 0 = \qquad\qquad , \ \sin 0 = \qquad\qquad , \ \tan 0 =$

$\frac{\pi}{4} = \left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right) \qquad \rightarrow \qquad \cos\frac{\pi}{4} = \qquad\qquad , \ \sin\frac{\pi}{4} = \qquad\qquad , \ \tan\frac{\pi}{4} =$

Examples

$\frac{\pi}{3} = ( \quad , \quad ) \ \rightarrow$ \qquad\qquad\qquad\qquad\qquad $\frac{\pi}{4} = ( \quad , \quad ) \ \rightarrow$

$\frac{\pi}{2} = ( \quad , \quad ) \ \rightarrow$ \qquad\qquad\qquad\qquad\qquad $\frac{2\pi}{3} = ( \quad , \quad ) \ \rightarrow$

$\frac{5\pi}{4} = ( \quad , \quad ) \ \rightarrow$ \qquad\qquad\qquad\qquad\qquad $\frac{3\pi}{2} = ( \quad , \quad ) \ \rightarrow$

$csc, \ sec, \ cot$

For the following, give the values for $\csc t, \sec t, \ $ and $\cot t$
$\frac{4\pi}{3} = ( \qquad , \qquad )$

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TB pg. 416 #3, 4, 8, 9, 14, 18.