

**Warm Up 12/5****Lesson 5-2c: Trigonometric Functions of Real Numbers III****Objectives**

Students will...

- Be able to rewrite trigonometric functions using the fundamental identities.
- Find all trigonometric functions from the value of one using the fundamental identities.

**Soh Cah Toa**

Recall that given a right triangle...

$$\sin t = \quad \quad \quad \cos t = \quad \quad \quad \tan t = \quad \quad \quad \csc t = \frac{1}{\sin t} =$$

$$\sec t = \frac{1}{\cos t} = \quad \quad \quad \cot t = \frac{1}{\tan t} =$$

We can use the properties of right triangles to figure out the rest of the trigonometric functions.

$$\sin t = -\frac{4}{5} \quad \cos t = \frac{3}{5} \quad \tan t = \quad \quad \quad \csc t = \quad \quad \quad \sec t = \quad \quad \quad \cot t =$$

If  $\cos t = -\frac{5}{13}$  and  $t$  is in quadrant II, find the values of all the trigonometric functions at  $t$ .**Trigonometric Functions**

Recall from the definitions of trigonometric functions that...

$$\tan t = \quad \quad \quad \cot t = \quad \quad \quad \sec t = \quad \quad \quad \csc t =$$

**Coordinates on a Unit Circle**

Now, also recall that on the unit circle, we defined the following:

$$\cos t = \quad \quad \quad \sin t = \quad \quad \quad \rightarrow \quad \quad \quad (x, y) =$$

Now, let's see how this can be applied on a unit circle.

**Pythagorean Identities**

Hence, we can now conclude the following identities:

$$\text{Pythagorean Identities: (Note: } \sin^2 t = (\sin t)^2 \text{)}$$

Also, moving some of these around using algebra:

$$\sin t = \pm \quad \quad \quad \cos t = \pm$$

**Rewriting Trigonometric Functions**

We can also rewrite trigonometric functions using others.

Example: Write  $\tan t$  in terms of  $\cos t$ , where  $t$  is in quadrant III.Write  $\tan t$  in terms of  $\sin t$ , where  $t$  is in quadrant I.Write  $\sec t$  in terms of  $\tan t$ , where  $t$  is in quadrant II