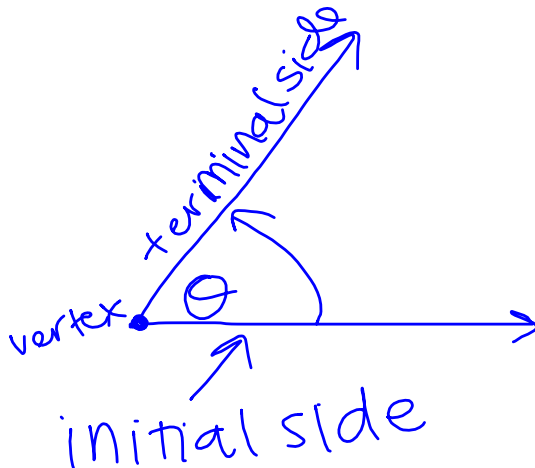


## 4.3 Trigonometry Extended

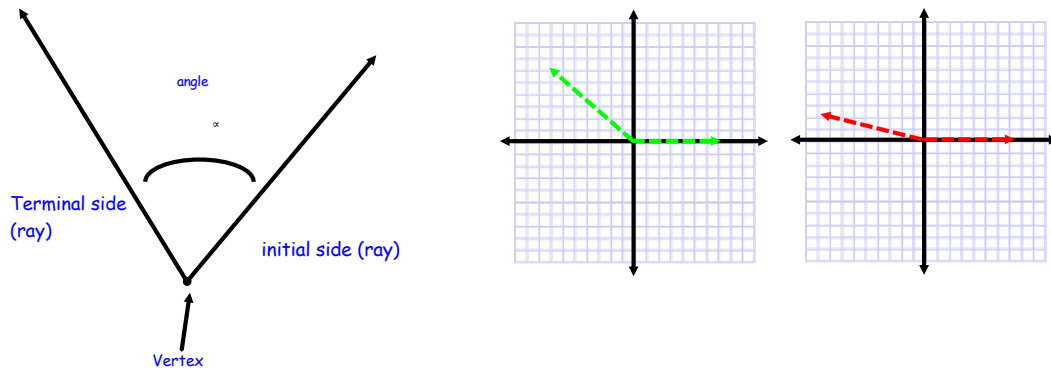
Objective: I can identify coterminal angles.

Objective: I can identify the sign of a trig function based on quadrants.

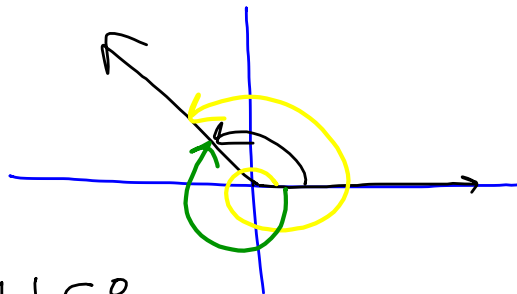
Objective: I can use reference triangles to solve for trig functions and angles.



## Vocabulary Review:



**coterminal angles:** angles in standard position with the same terminal ray  
 example



$$\begin{aligned}
 &115^\circ \\
 &= 475^\circ \\
 &= -245^\circ
 \end{aligned}$$

Find a positive and negative angle that are coterminal with

$$\begin{array}{r} -150^\circ \\ +360^\circ \\ \hline \end{array}$$

$$\boxed{210^\circ}$$

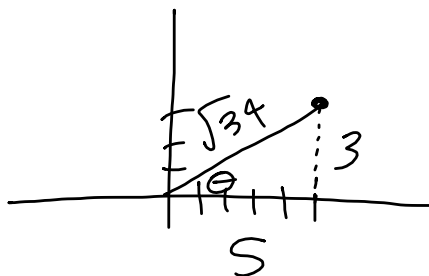
$$-150 - 360$$

$$\boxed{-510^\circ}$$

$$\frac{2\pi}{3} + \frac{6\pi}{3} = \frac{8\pi}{3}$$

$$\frac{2\pi}{3} - 2\pi = \frac{-4\pi}{3}$$

Let  $\theta$  be the acute angle in standard position whose terminal side contains the point (5, 3). Find all the trigonometric functions.



$$\begin{aligned} 25 + 9 &= c^2 \\ \sqrt{34} &= \sqrt{c^2} \end{aligned}$$

$$\sin \theta = \frac{3}{\sqrt{34}}$$

$$\csc \theta = \frac{\sqrt{34}}{3}$$

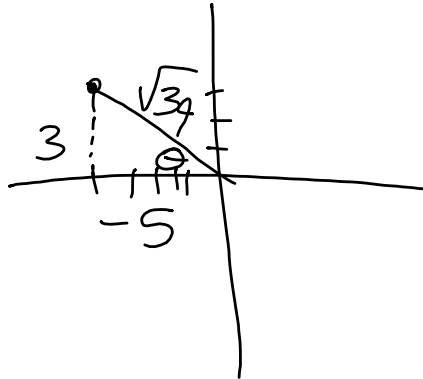
$$\cos \theta = \frac{5}{\sqrt{34}}$$

$$\sec \theta = \frac{\sqrt{34}}{5}$$

$$\tan \theta = \frac{3}{5}$$

$$\cot \theta = \frac{5}{3}$$

Let  $\theta$  be the acute angle in standard position whose terminal side contains the point  $(-5, 3)$ . Find all the trigonometric functions.

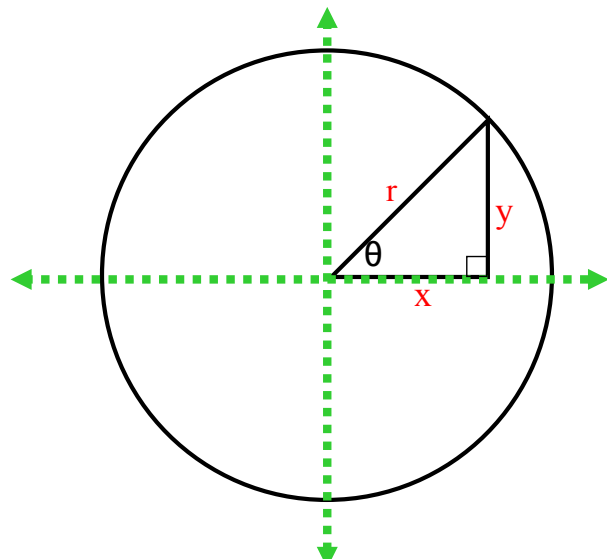


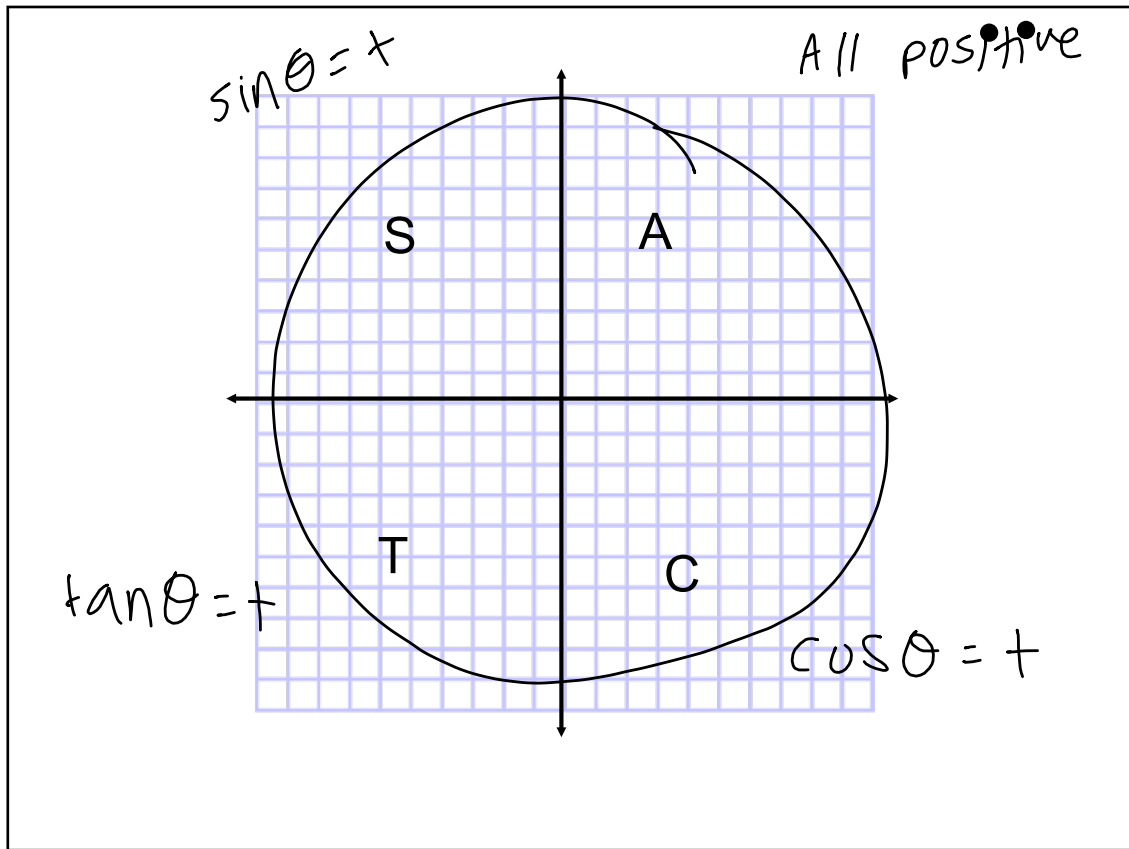
$$\sin \theta = \frac{\text{opp}}{\text{hyp}} = \frac{y}{r}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}} = \frac{x}{r}$$

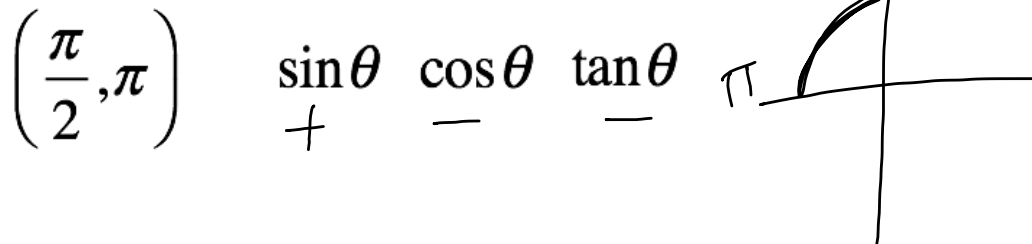
$$\tan \theta = \frac{\text{opp}}{\text{adj}} = \frac{y}{x}$$

$$\sec \theta = \frac{\text{hyp}}{\text{adj}} = \frac{r}{x} \quad \csc \theta = \frac{\text{hyp}}{\text{opp}} = \frac{r}{y} \quad \cot \theta = \frac{\text{adj}}{\text{opp}} = \frac{x}{y}$$

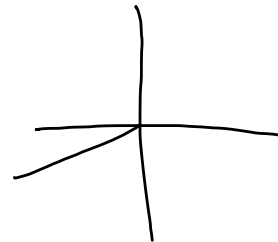




Give the sign without using a calculator



$\tan 192^\circ$   $+$

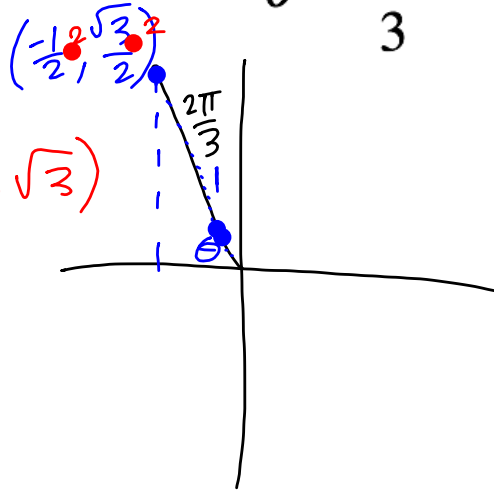


Choose a point on the terminal side of  $\theta = \frac{2\pi}{3}$

$$(-1, 1)$$

$$(-1, \sqrt{3})$$

$$(-\sqrt{3}, 1)$$



Find the following without a calculator:

$$\sin(-210^\circ)$$

$$\sin(150^\circ)$$

$$\frac{1}{2}$$

$$\tan\left(\frac{5\pi}{3}\right)$$

$$-\sqrt{3}$$

$$\sec\left(\frac{-3\pi}{4}\right)$$

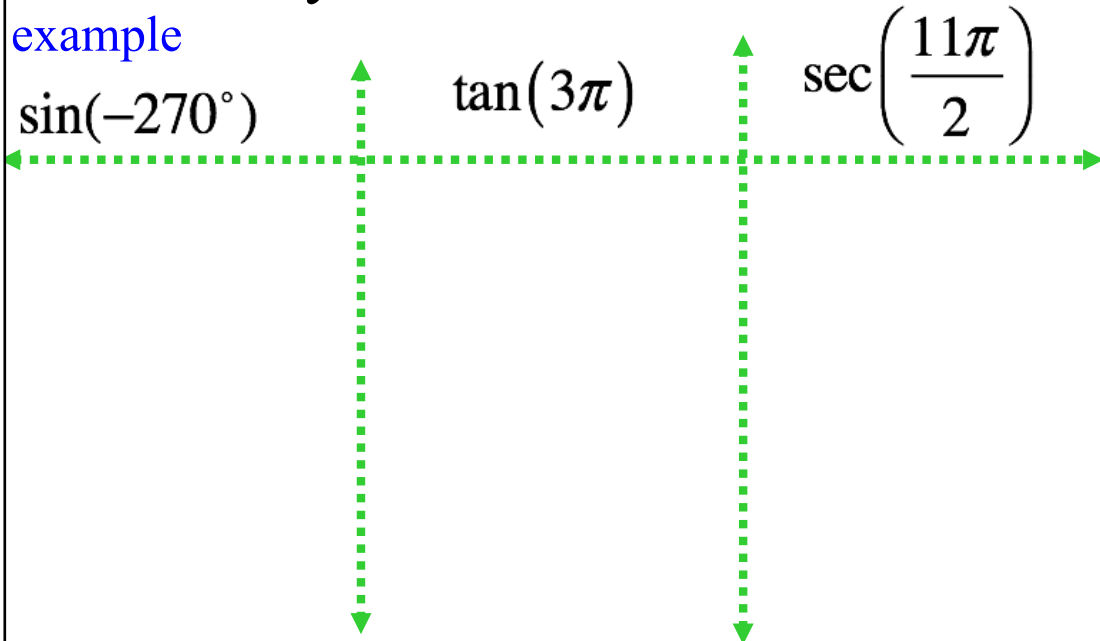
$$\sec\left(\frac{5\pi}{4}\right)$$

$$-\frac{2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$$

$$-\frac{\cancel{2}\sqrt{2}}{\cancel{2}} = \boxed{-\sqrt{2}}$$

**quadrantal angles:** angles with the terminal ray on one of the axes

example

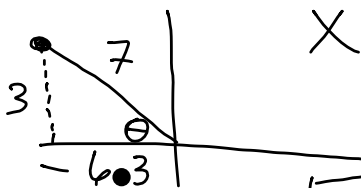


Find  $\cos\theta$  and  $\tan\theta$  by using the given information to construct a reference triangle

$$\sin\theta = \frac{3 \text{ opp}}{7 \text{ hyp}} \quad \tan\theta < 0$$

$$\sec\theta = 3 \text{ opp} \Rightarrow \sin\theta > 0$$

$$\cos\theta = \frac{1}{3} \text{ hyp}$$



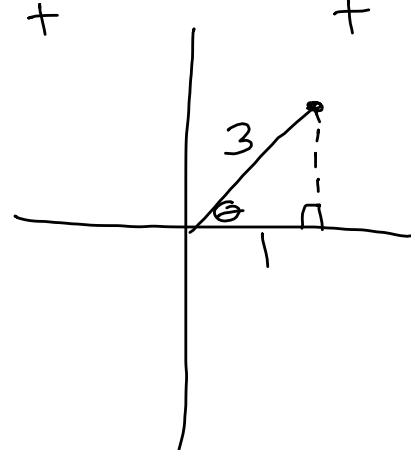
$$3^2 + b^2 = 7^2$$

$$b^2 = 40$$

$$b = 6.3$$

$$\cos\theta = \frac{-6.3}{7}$$

$$\tan\theta = \frac{3}{-6.3}$$



**December 06, 2016**

