

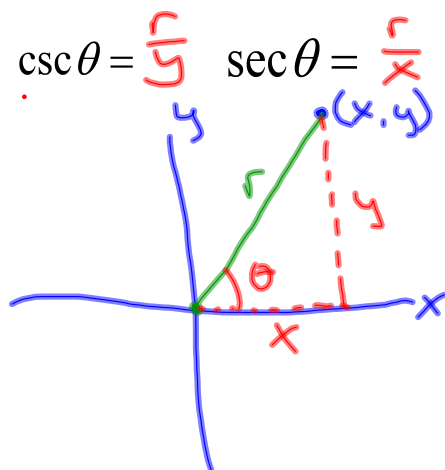
Chapter 4.4: Trig Functions of Any Angle

for any point (x, y)

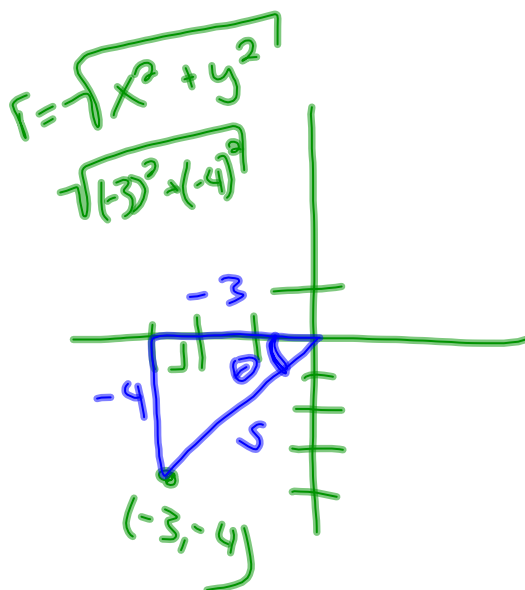
$$r = \sqrt{x^2 + y^2}$$

$$\sin \theta = \frac{y}{r} \quad \cos \theta = \frac{x}{r} \quad \tan \theta = \frac{y}{x}$$

$$\csc \theta = \frac{r}{y} \quad \sec \theta = \frac{r}{x} \quad \cot \theta = \frac{x}{y}$$



Let $P = (-3, -4)$ be a point on the terminal side of theta. Find each of the 6 trig functions.



$$\sin = \frac{-4}{5}$$

$$\cos = \frac{-3}{5}$$

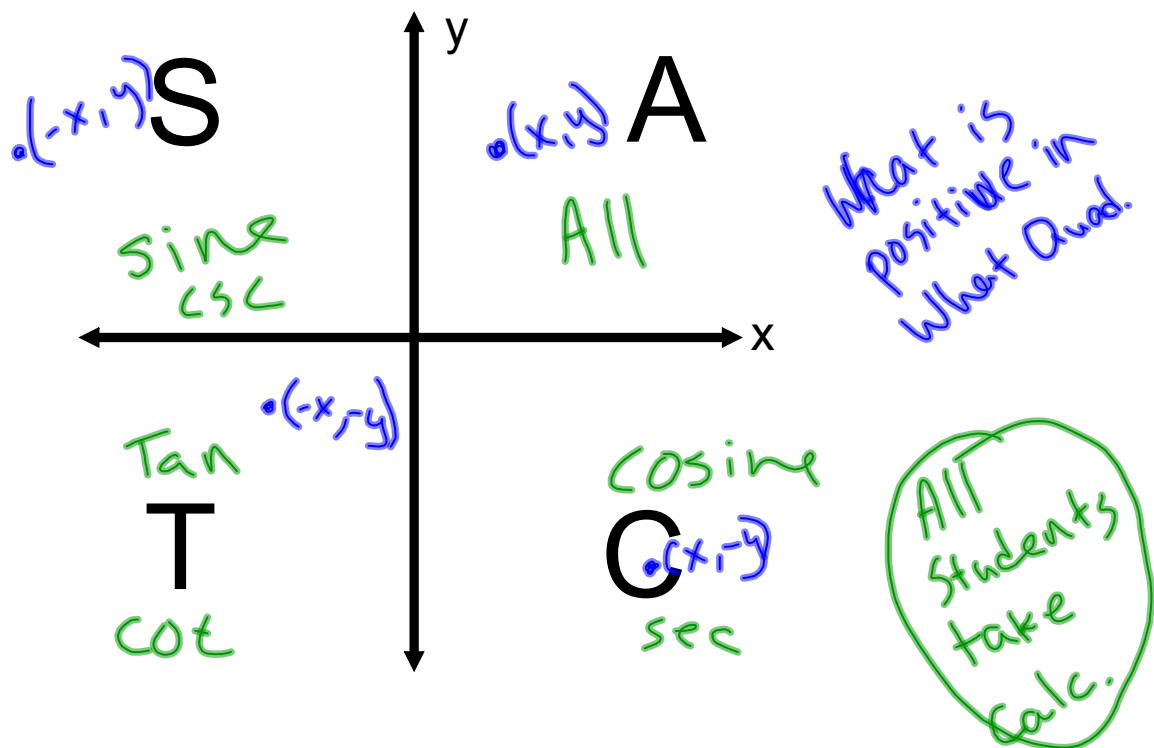
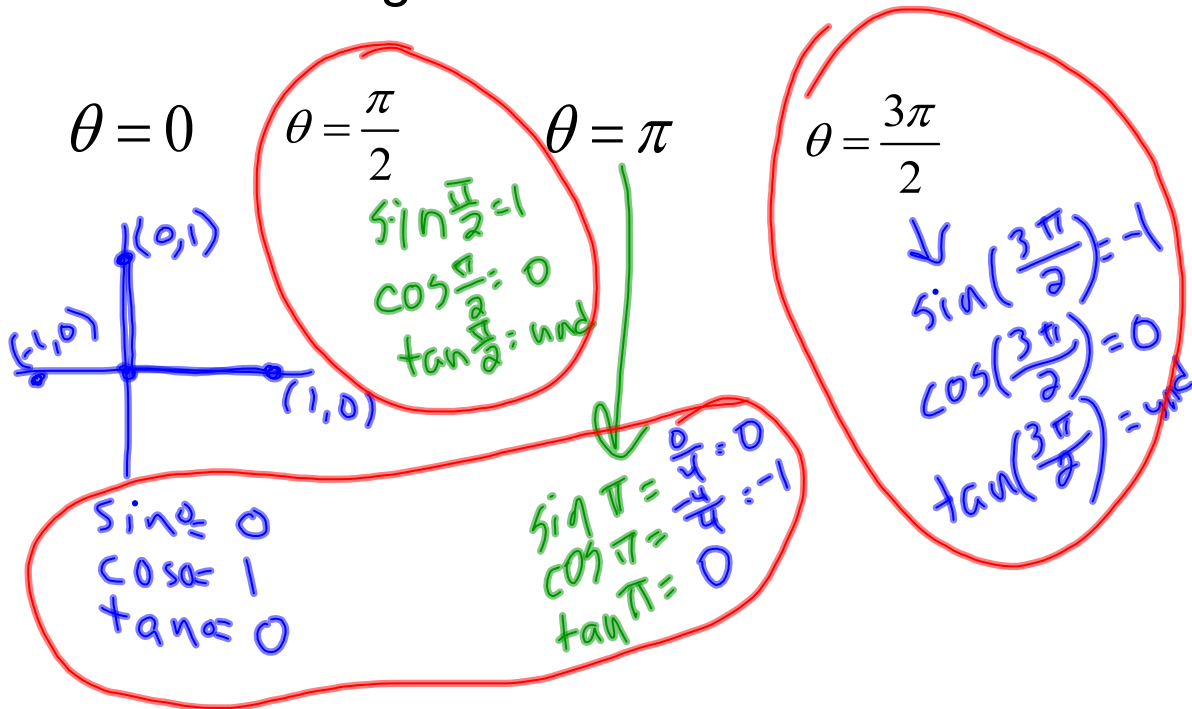
$$\tan = \frac{4}{3}$$

$$\csc = -\frac{5}{4}$$

$$\sec = -\frac{5}{3}$$

$$\cot = \frac{3}{4}$$

Evaluate, if possible, sine, cosine, tangent of the following.



If $\tan\theta < 0$ and $\cos\theta > 0$ name the quadrant in which angle θ lies.

Q4

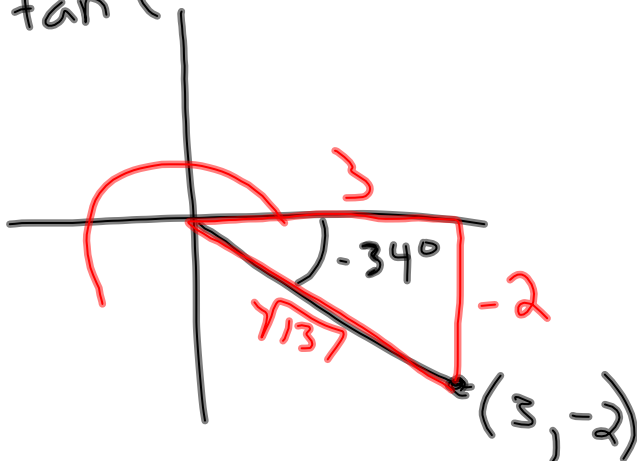
$$\tan = -$$

$$\cos = +$$

Given $\tan\theta = -\frac{2}{3}$ and $\cos\theta > 0$, find $\cos\theta$ and $\csc\theta$

$$\tan^{-1}(-2/3)$$

$$\tan\theta = \frac{y}{x} = -\frac{2}{3}$$



$$\sqrt{3^2 + (-2)^2}$$

$$\sqrt{9 + 4} = \sqrt{13}$$

$$\cos\theta = \frac{3}{\sqrt{13}}$$

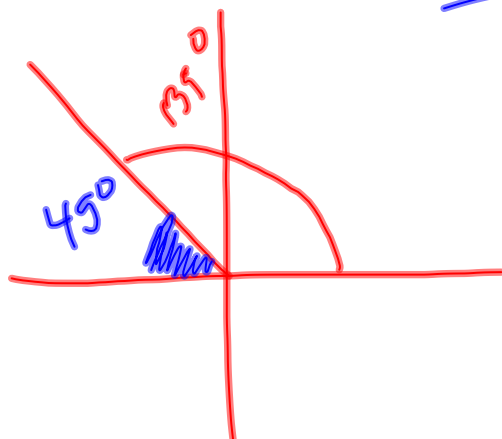
$$= \frac{3\sqrt{13}}{13}$$

$$\csc\theta = \frac{\sqrt{13}}{-2}$$

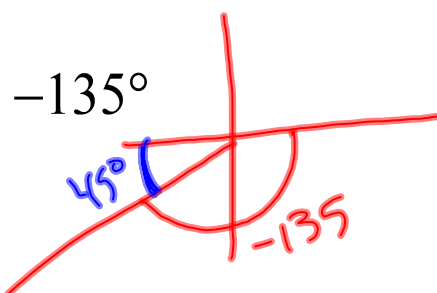
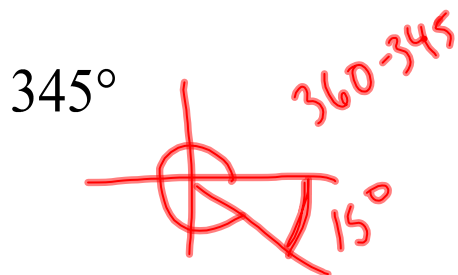
$$= -\frac{\sqrt{13}}{2}$$

Reference Angles:

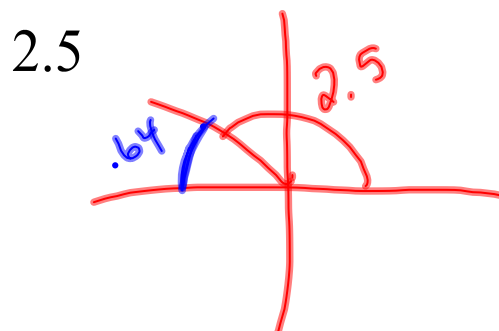
For any angle in reference angle is the acute angle to the x-axis.



Find the reference angle



$$\frac{5\pi}{6} = \frac{\pi}{6}$$



Using the reference angle to find trig values:

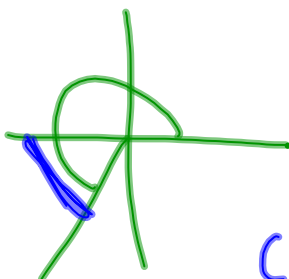
- Find the reference angle
- Use the quadrant sign to get +/-

use reference angles to find

$$\sin 135^\circ$$

$$\cos \frac{4\pi}{3}$$

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



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

$$\left(-\frac{1}{2} \right)$$

$$\begin{aligned} \sin(135) &= \sin(45) \\ &= \frac{\sqrt{2}}{2} \end{aligned}$$

suggested problems: chapter 4.4
pg.474 #'s 7,9,13,17,19,21,23,29,
33,35,39,41,43,45,47,51,57,65