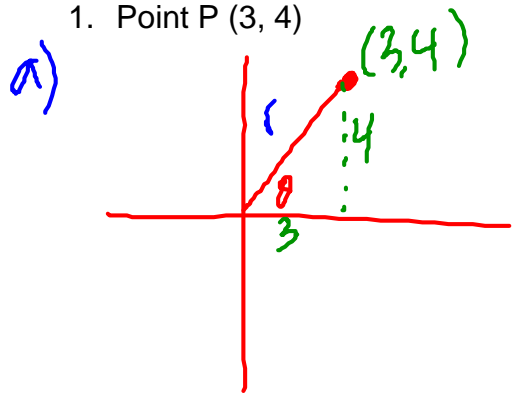


## Trigonometric Ratios with Obtuse Angles

For each given point that lies on the terminal arm of an angle:

- Sketch a diagram for the angle in standard position.
- Determine the distance from the origin to the point.
- Determine the primary trigonometric ratios to four decimal places.
- Determine the measure of the angle.

1. Point P (3, 4)

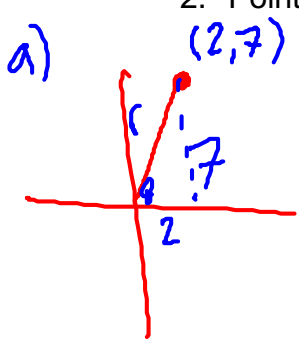
a) 

b)  $r^2 = 3^2 + 4^2$   
 $r^2 = 25$   
 $r = 5$

c)  $\sin \theta = \frac{4}{5}$   
 $= 0.8$   
 $\cos \theta = \frac{3}{5}$   
 $= 0.6$   
 $\tan \theta = \frac{4}{3}$   
 $= 1.3333$

d)  $\sin \theta = 0.8$   
 $\theta = 53.1^\circ$

2. Point Q (2, 7)

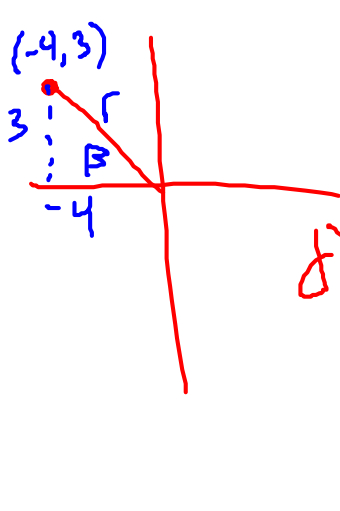
a) 

b)  $r^2 = 2^2 + 7^2$   
 $r^2 = 53$   
 $r = 7.3$

c)  $\sin \theta = \frac{7}{7.3}$   
 $= 0.9589$   
 $\cos \theta = \frac{2}{7.3}$   
 $= 0.2740$   
 $\tan \theta = \frac{7}{2}$   
 $= 3.5$

d)  $\tan \theta = 3.5$   
 $\theta = 74^\circ$

3. Point R (-4, 3)

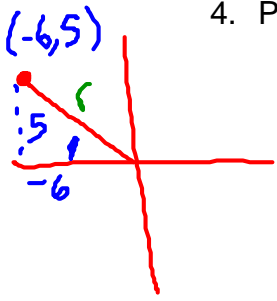
a) 

b)  $r = 5$

c)  $\sin \theta = \frac{3}{5}$   
 $= 0.6$   
 $\cos \theta = \frac{-4}{5}$   
 $= -0.8$   
 $\tan \theta = \frac{3}{-4}$   
 $= -0.75$

d)  $\beta = \sin^{-1}(0.6)$   
 $= 37^\circ$   
 $\theta = 180 - \beta$   
 $= 143^\circ$

4. Point S(-6, 5)



$$\begin{aligned} b) \quad r^2 &= 25 + 36 \\ r^2 &= 61 \\ r &= 7.8 \end{aligned}$$

$$\begin{aligned} c) \quad \sin \theta &= \frac{5}{7.8} \\ &= 0.6410 \end{aligned}$$

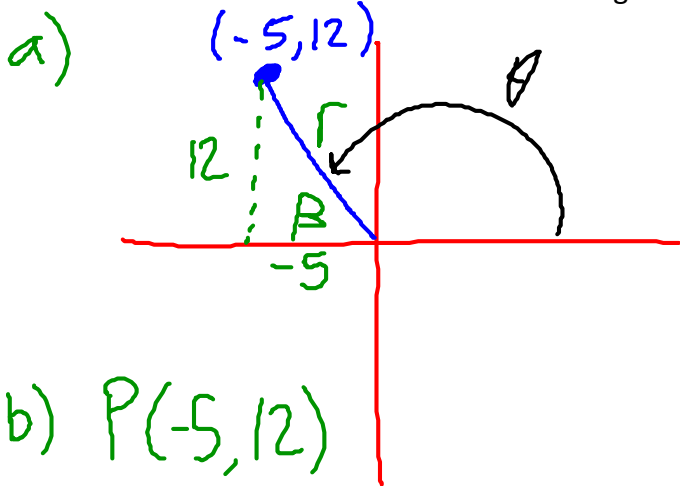
$$\begin{aligned} \cos \theta &= \frac{-6}{7.8} \\ &= -0.7692 \\ \tan \theta &= \frac{5}{-6} \\ &= -0.8333 \end{aligned}$$

$$\begin{aligned} d) \quad \beta &= \sin^{-1} 0.6410 \\ &= 40^\circ \\ \theta &= 180 - 40 \\ &= 140^\circ \end{aligned}$$

$$\tan \theta = \frac{y}{x}$$

The tangent of an obtuse angle,  $\theta$ , in standard position is  $-\frac{12}{5}$ .

- Sketch a diagram of angle  $\theta$ .
- Identify the coordinates of a point that lies on the terminal arm of angle  $\theta$ .
- Determine  $\sin \theta$  and  $\cos \theta$ .
- Determine the measure of angle  $\theta$ .



only x will be negative

b)  $P(-5, 12)$

$$\begin{aligned} c) \quad r^2 &= (-5)^2 + (12)^2 \\ r^2 &= 25 + 144 \\ \sqrt{r^2} &= \sqrt{169} \\ r &= 13 \end{aligned}$$

$$\sin \theta = \frac{12}{13}$$

$$\cos \theta = \frac{-5}{13}$$

d) First find  $\beta$

$$\begin{aligned} \sin \beta &= \frac{12}{13} \\ \beta &= 67^\circ \end{aligned}$$

$$\begin{aligned} \theta &= 180 - \beta \\ \theta &= 113^\circ \end{aligned}$$