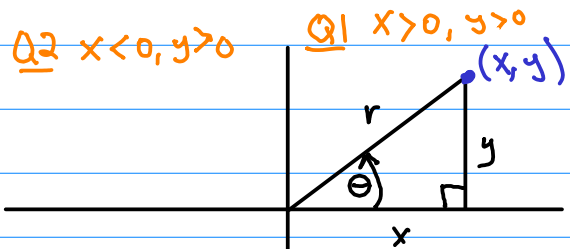


## Trigonometry in the x-y Plane



$$\sin(\theta) = y/r \rightarrow y = r \sin(\theta)$$

$$\cos(\theta) = x/r \rightarrow x = r \cos(\theta)$$

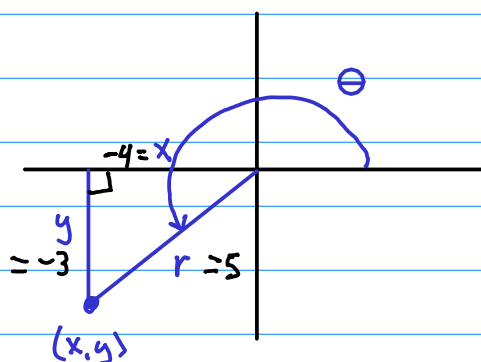
$$\tan(\theta) = y/x$$

$\theta \rightarrow$  drawn counter-clock  
from pos. x-axis

Q3:  $x < 0, y < 0$

Q4:  $x > 0, y < 0$

eg  $\cos(\theta) = -\frac{4}{5}$ , and  $\theta$  is in 3<sup>rd</sup> Quadrant. Find the other trig function values.



$$\cos(\theta) = \frac{-4}{5} \rightarrow \frac{x}{r}$$

$$(-4)^2 + y^2 = 5^2$$

$$y^2 = 25 - 16$$

$$y^2 = 9 \Rightarrow y = \pm\sqrt{9}$$

$$y = \pm 3$$

$\theta$  in Q3  $\Rightarrow y < 0$

$$\Rightarrow \boxed{y = -3}$$

$$\sin(\theta) = y/r = -3/5$$

$$\tan(\theta) = y/x = -3/-4 = 3/4$$

$$\csc(\theta) = \frac{1}{\sin(\theta)} = -5/3$$

$$\sec(\theta) = -5/4$$

$$\cot(\theta) = 4/3$$