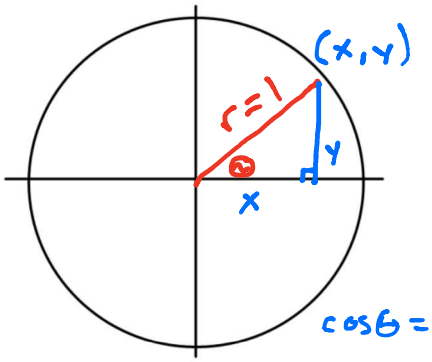
The Trigonometric Functions

18.3 – Reference Triangles

Name_____

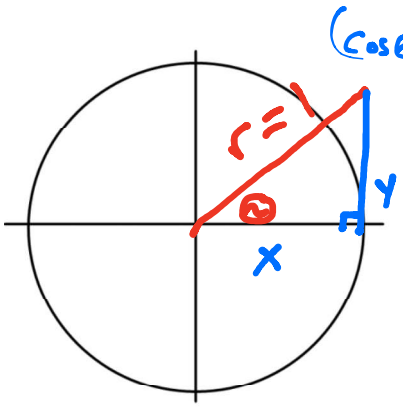
Unit Circle - A circle with radius 1 whose center is at the origin.



$\cos\theta = \frac{x}{r} = \frac{x}{1} = x$

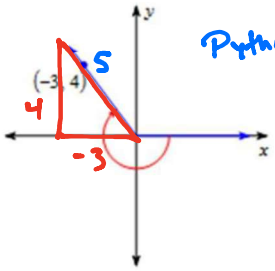
$\sin\theta = \frac{y}{r} = \frac{y}{1} = y$

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



Reference Triangle – A right triangle in the coordinate plane with an acute angle at the origin and one leg on the x-axis.

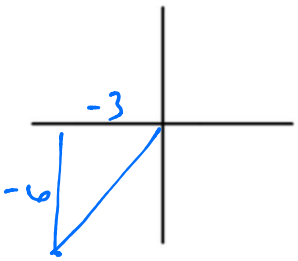
1. Find $\sin\theta$ $= \frac{4}{5}$



Pythag Triple

3-4-5
5-12-13
7-24-25
8-15-17

2. If $T(-3,-6)$, find $\cos\theta$ $= \frac{-3}{3\sqrt{5}} = \frac{-\sqrt{5}}{5}$



$x^2 + y^2 = r^2$

$(-3)^2 + (-6)^2 = r^2$

$9 + 36 = r^2$

$45 = r^2$

$\pm\sqrt{45} = r$

$+3\sqrt{5} = r$

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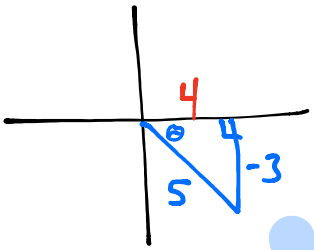
Name_____

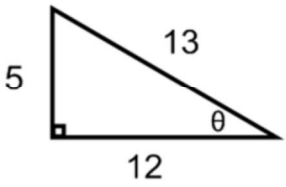
3. Given θ is in Quadrant IV and $\sin\theta = -\frac{3}{5}$, then find $\cos\theta$.



$\sin\theta = \frac{y}{r} = \frac{-3}{5}$

$\cos\theta = \frac{4}{5}$

4.



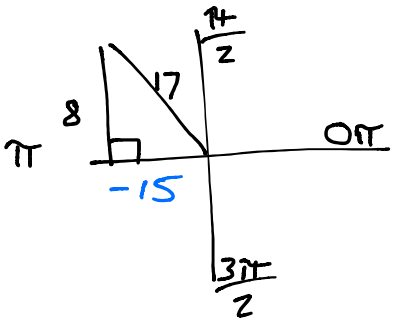
$\sin\theta = \frac{5}{13}$

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

$\tan\theta = \frac{5}{12}$

5. Given $\frac{\pi}{2} \le \theta \le \pi$ and $\sin\theta = \frac{8}{17}$ ($=y$, $=r$), then find

QUAD II

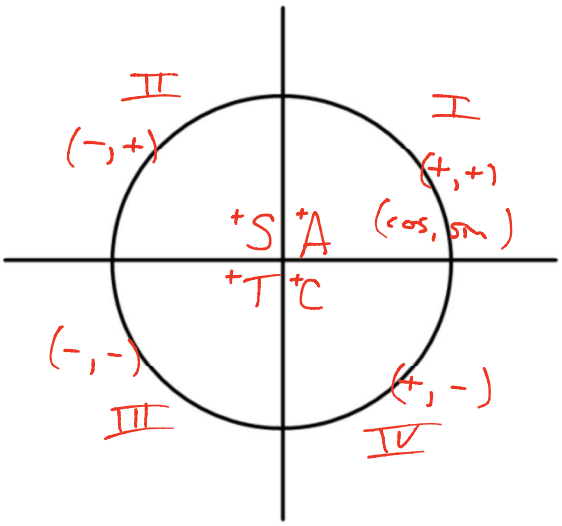


$\sin\theta = \frac{8}{17}$

$\cos\theta = \frac{-15}{17}$

$\tan\theta = \frac{8}{-15}$

Positive Negative Quadrants



What quadrant(s) can θ lie if…

a. $\sin\theta > 0$ ($y>0$) and $\cos\theta < 0$ ($x<0$)

II

b. $\sin\theta$ and $\tan\theta$ have the same sign

I, II, IV