PreCalculus 11 Date _____

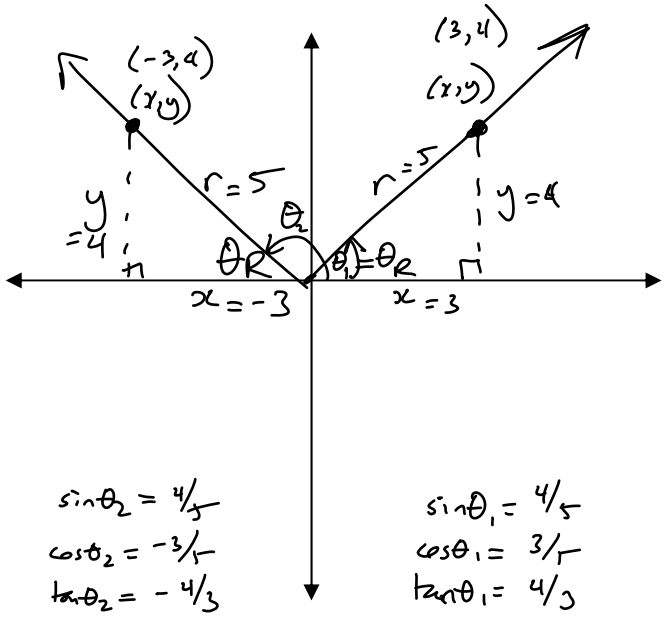
Unit 6: Standard Position Trigonometry
6.2 Trigonometric Ratios of Any Angle

Key questions yet to be answered about trigonometry:

- How can an angle greater than 90° have primary trigonometric ratios? ex. $\tan 200° = 0.3640$
- How can an angle have a negative primary trigonometric ratio? ex. $\cos 100° = -0.1736$

Use your calculator to determine the following ratios to 4 decimal places:

$\theta_R = 30°$	$\theta_R = 40°$	$\theta_R = 50°$
$\sin 30° =$ 0.5	$\cos 40° =$ 0.7660	$\tan 50° =$ 1.1918
$\sin 150° =$ 0.5	$\cos 140° =$ -0.7660	$\tan 130° =$ -1.1918
$\sin 210° =$ -0.5	$\cos 220° =$ -0.7660	$\tan 230° =$ 1.1918
$\sin 330° =$ -0.5	$\cos 320° =$ 0.7660	$\tan 310° =$ -1.1918



$\sin\theta_2 = 4/5$
$\cos\theta_2 = -3/5$
$\tan\theta_2 = -4/3$

$\sin\theta_1 = 4/5$
$\cos\theta_1 = 3/5$
$\tan\theta_1 = 4/3$

Consider a point (x,y) on the terminal arm of θ in standard position.
x = adjacent y = opposite r (radius) = hypotenuse

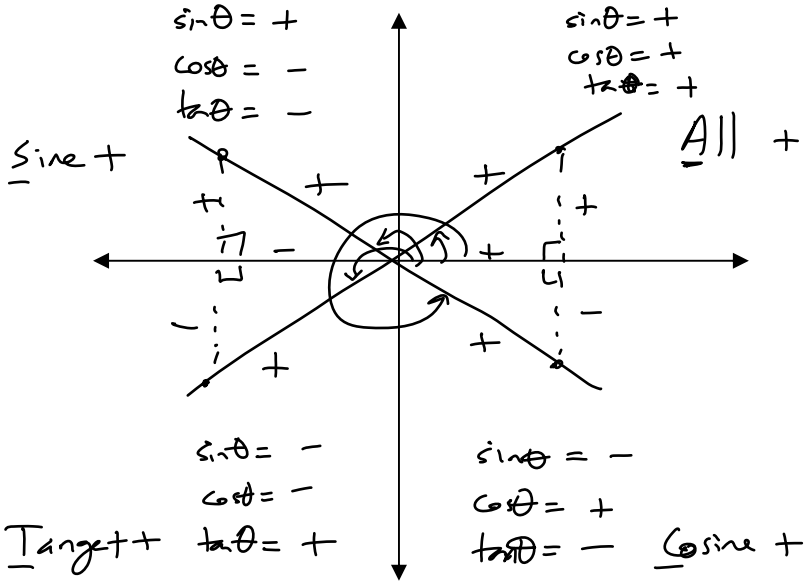
$r = \sqrt{x^2+y^2}$

$\sin\theta = y/r$

$\cos\theta = x/r$

$\tan\theta = y/x$

Determine which trig ratios are positive for each quadrant.



"All Soup Turns Cold"

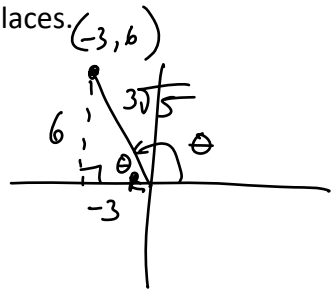
OR

"All Students Take Calculus"

ex. Without using a calculator state if each ratio is positive or negative:

$\sin 260° = -$ $\quad \cos 315° = +$ $\quad \tan 91° = -$

ex. The point P(-3, 6) lies on the terminal arm of an angle θ in standard position. Draw θ and determine the rations for $\sin\theta$, $\cos\theta$ and $\tan\theta$ both as exact values and approximations to 4 decimal places.



$r = \sqrt{(-3)^2 + (6)^2}$
$= \sqrt{9+36}$
$= \sqrt{45} = \sqrt{9 \cdot 5}$
$= 3\sqrt{5}$

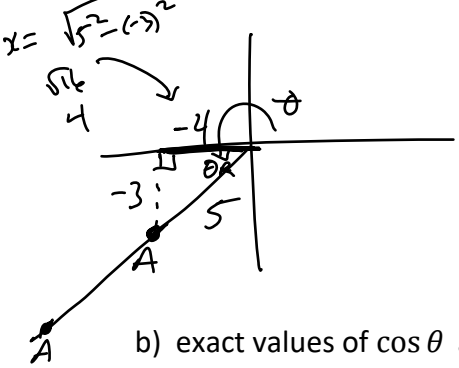
$\sin\theta = \frac{6}{3\sqrt{5}} = \frac{2}{\sqrt{5}} \approx 0.8944$

$\cos\theta = \frac{-3}{3\sqrt{5}} = \frac{-1}{\sqrt{5}} \approx -0.4472$

$\tan\theta = \frac{6}{-3} = -2$

ex. Suppose θ is an angle in standard position with terminal arm in quadrant III and $\sin\theta = -\frac{3}{5}$, find:

a) possible coordinates of A, a point on the terminal arm.



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

A (-4, -3) or A (-8, -6)

b) exact values of $\cos\theta$ and $\tan\theta$

$\cos\theta = -4/5$

$\tan\theta = -3/-4 = 3/4$

Practice: pg. 96/ # 1, 3 – 6, 8, 11, 14, 16, 22