Before we begin, are there any questions from last day's work?

Today's Learning Goal(s):

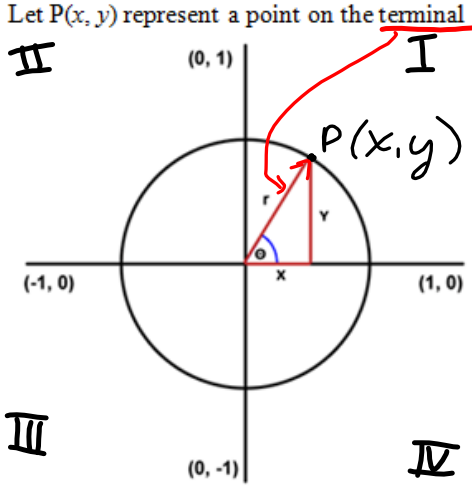
By the end of the class, I will be able to:

a) state the 3 primary trig ratios for an angle in standard position.

b) determine **exact** trig ratios given one trig ratio,
or a point on the terminal arm.

4.1.1 Angles in Standard Position/The Primary Trigonometric Ratios Date: Apr. 3 /18

Let P(x, y) represent a point on the terminal arm of θ.



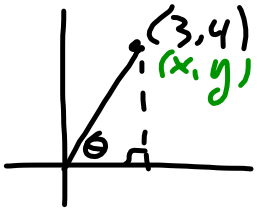
$r^2 = x^2 + y^2$ (PT) r must be positive

SoH CAH TOA

$\sin\theta = \frac{opp}{hyp} = \frac{y}{r}$ $\cos\theta = \frac{adj}{hyp} = \frac{x}{r}$ $\tan\theta = \frac{opp}{adj} = \frac{y}{x}$

SYR CXR TYX

Ex. 1 The point P(3,4) lies on the terminal arm θ of Determine the primary trig ratios.



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

$= (3)^2 + (4)^2$

$= 9 + 16$

$= 25$

$r = \pm\sqrt{25}$

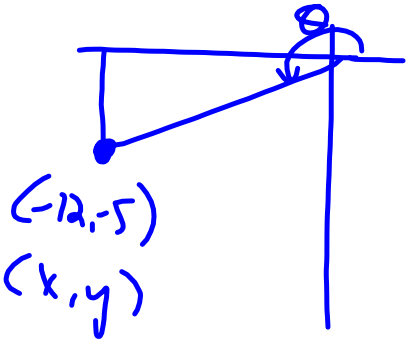
$r = 5$ or $r = -5$ but $r > 0$

$\therefore r = 5$

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

$\sin\theta = \frac{4}{5}$ $\cos\theta = \frac{3}{5}$ $\tan\theta = \frac{4}{3}$

Ex. 2 The point P(-12, -5) lies on the terminal arm θ of Determine the primary trig ratios.



$r^2 = (-12)^2 + (-5)^2$

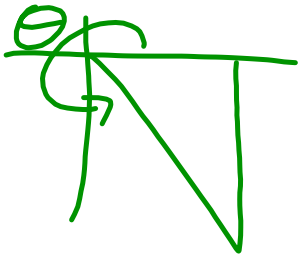
$= 144 + 25$

$= 169$

$r = 13$

$\sin\theta = \frac{y}{r} = \frac{-5}{13}$ $\cos\theta = \frac{x}{r} = \frac{-12}{13}$ $\tan\theta = \frac{y}{x} = \frac{-5}{-12} = \frac{5}{12}$

Ex. 3 Angle θ has its terminal arm in quadrant IV, and $\sin\theta = -\frac{4}{5}$. Determine cosθ and tanθ.



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

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

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

$\therefore y = -4 \quad r = 5$

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

$x^2 = r^2 - y^2$

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

$= 25 - 16$

$= 9$

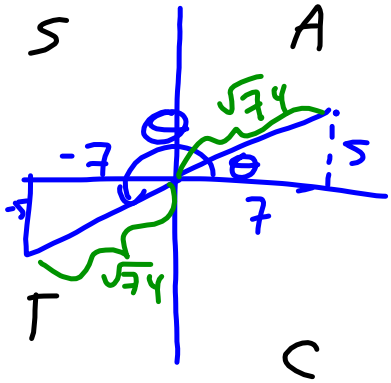
$\therefore x = \pm 3$, but QIV

$\therefore x = +3$

$\cos\theta = \frac{x}{r} = \frac{3}{5}$

$\tan\theta = \frac{y}{x} = \frac{-4}{3}$

Ex. 4 Angle θ is in standard position. If $\tan\theta = \frac{5}{7}$, determine sinθ and cos θ.



tyx $\therefore \tan\theta = \frac{5}{7}\left(\frac{y}{x}\right)$

$\therefore y = 5 \quad x = 7$

$r^2 = (7)^2 + (5)^2$

$= 49 + 25$

$= 74$

$r = \sqrt{74}$

$\sin\theta = \frac{y}{r} = \frac{5}{\sqrt{74}}$

$\cos\theta = \frac{x}{r} = \frac{7}{\sqrt{74}}$

OR

$\sin\theta = \frac{-5}{\sqrt{74}} \quad \cos\theta = \frac{-7}{\sqrt{74}}$