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

Today's Learning Goal(s):

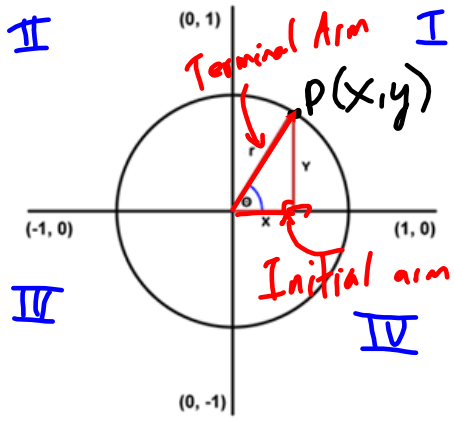
By the end of the class, I will be able to:

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. 5/16

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

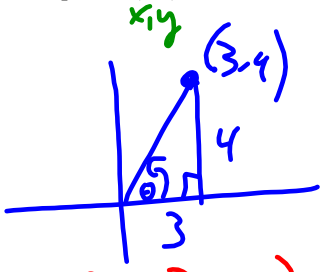


$r^2 = x^2 + y^2$

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

SYR CXR TYX

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



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

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

$3^2 + 4^2 = r^2$

$9 + 16 = r^2$

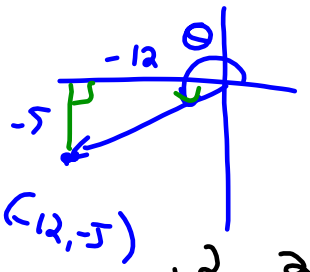
$r^2 = 25$

$r = \pm\sqrt{25}$

$r = 5$ or ~~$r = -5$~~

But radius MUST Be Positive

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



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

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

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

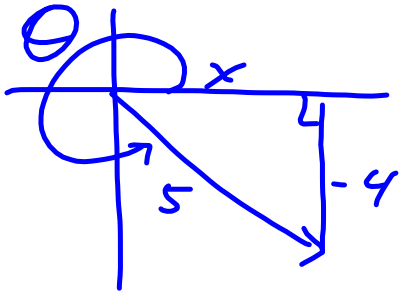
$144 + 25 = r^2$

$r^2 = 169$

$r = \sqrt{169}$

$= 13$

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



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

$\therefore y = -4$

$r = 5$

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

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

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

$x^2 + 16 = 25$

$x^2 = 25 - 16$

$= 9$

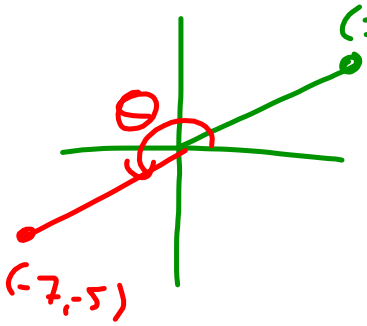
$x = \pm\sqrt{9}$

$x = \pm 3$ → $x = 3$ b/c quad IV given in question.

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

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

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



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

$\therefore x = 7, y = 5$

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

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

$49 + 25 = r^2$

$74 = r^2$

$r = \sqrt{74}$

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

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

if $x = -7, y = -5$ $r = \sqrt{74}$

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

$\tan\theta = \frac{-5}{-7} = \frac{5}{7}$