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

Today's Learning Goal(s):

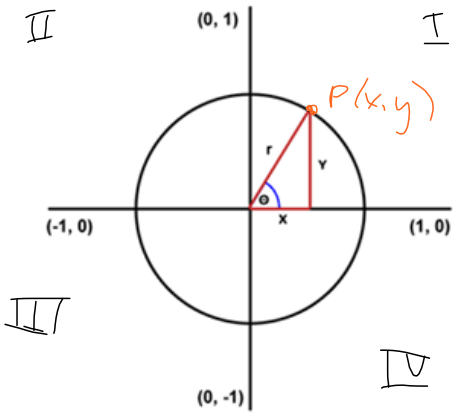
By the end of the class, I will be able to:

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: Oct. 22

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



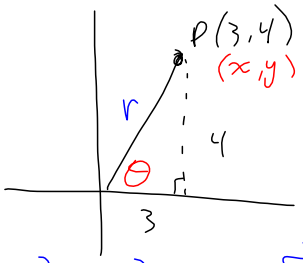
$r^2 = x^2 + y^2$

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

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

SYR CXR TYX

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



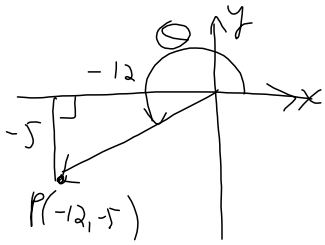
$\sin\theta = \frac{y}{r}$ $\cos\theta = \frac{x}{r}$ $\tan\theta = \frac{y}{x}$

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

$r^2 = x^2 + y^2$
$= 3^2 + 4^2$
$= 9 + 16$
$= 25$

$r^2 = 25$
$r = \pm\sqrt{25}$
* But radius is ALWAYS POSITIVE
$\therefore r = 5$ units

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

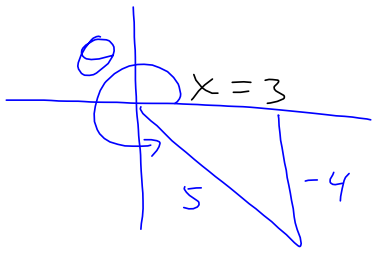


SYR CXR TYX

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

$r^2 = x^2 + y^2$
$= (-12)^2 + (-5)^2$
$= 144 + 25$
$= 169$
$r = \sqrt{169}$
$= 13$ units

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



IV

SYR

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

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

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

CXR

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

$= \frac{3}{5}$

TYX

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

$= -\frac{4}{3}$

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

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

$x^2 + 16 = 25$

$x^2 = 25 - 16$

$x^2 = 9$

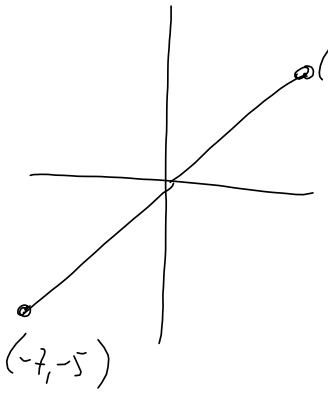
$x = \pm\sqrt{9}$

$x = \pm 3$

But given in Q. IV

$\therefore x = 3$

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



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

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

$= 49 + 25$

$= 74$

$r = \sqrt{74}$

TYX

$y = 5$ and $x = 7$

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

$= \frac{5}{\sqrt{74}}$ $= \frac{7}{\sqrt{74}}$

or

$y = -5$ & $x = -7$

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

$= \frac{5}{7}$

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

Today's Work: **Be well prepared for the Unit 3 Summative Tomorrow**
(posted online) 4.1.2 1bcdf, 2efgh, 6, 7