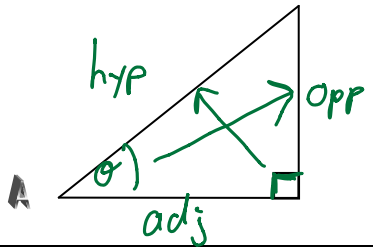
4.4 Determining Trigonometric Ratios

Review of Grade 10 Trigonometry:

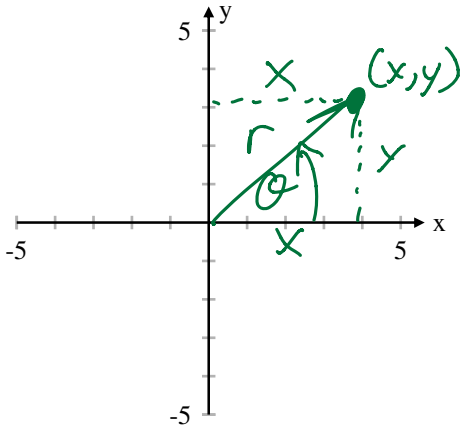


$$\sin A = \frac{opposite}{hypotenuse} \qquad \cos A = \frac{adjacent}{hypotenuse} \qquad \tan A = \frac{opposite}{adjacent}$$

SohCahToa

$S\frac{O}{H}\ C\frac{A}{H}\ T\frac{O}{A}$

Review definitions from Pre-Calc 11:



Given an angle θ, that has a terminal arm that passes through point P (*x*, y), the trigonometric ratios are:

$\sin\theta = \frac{y}{r}$	$\csc\theta = \frac{1}{\sin\theta} = \frac{r}{y}$
$\cos\theta = \frac{x}{r}$	$\sec\theta = \frac{1}{\cos\theta} = \frac{r}{x}$
$\tan\theta = \frac{y}{x}$	$\cot\theta = \frac{1}{\tan\theta} = \frac{x}{y}$

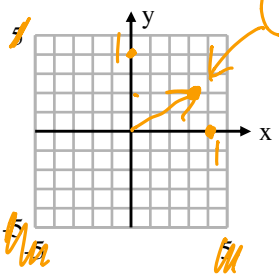
Where $x^2 + y^2 = r^2$

In a unit circle {unit circles have a radius of 1}, $\sin\theta =$ ___y___, $\cos\theta =$ ___x___.

If $\theta = \frac{\pi}{6}$ in a unit circle, find possible coordinates for *x* and *y*.

$\sin\frac{\pi}{6} = y$ $\quad \frac{1}{2} = y$

$\cos\frac{\pi}{6} = x$ $\quad \frac{\sqrt{3}}{2} = x$



$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

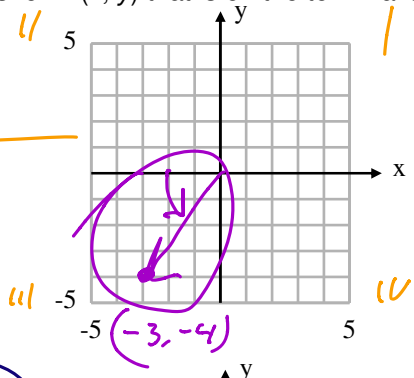
$\tan\theta$ can also be defined as: $\tan\theta = \frac{\sin\theta}{\cos\theta}$

If $\sin\theta = \frac{3}{\sqrt{10}}$ and $\cos\theta = \frac{1}{\sqrt{10}}$, find $\tan\theta$.

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

$= \frac{\left(\frac{3}{\sqrt{10}}\right)}{\left(\frac{1}{\sqrt{10}}\right)} \rightarrow 3$

If $\pi < \theta < \frac{3\pi}{2}$ and $\cos\theta = -\frac{3}{5}$, find possible coordinates for P (*x*, *y*) that is on the terminal arm of an angle θ.

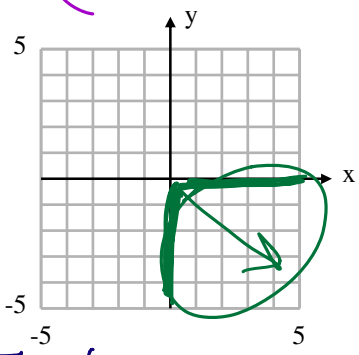


If $\cos\theta = \frac{a}{a+1}$ and θ is in quadrant IV:

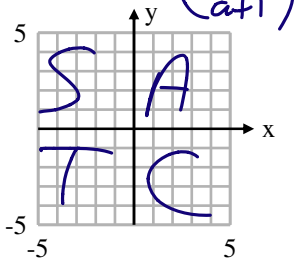
a. Draw the angle in standard position

b. Determine $\sin\theta$

c. Determine $\tan\theta$



What quadrant are you in if $\sin\theta > 0$ and $\tan\theta > 0$



What quadrant are you in if $\cos\theta > 0$ and $\tan\theta < 0$