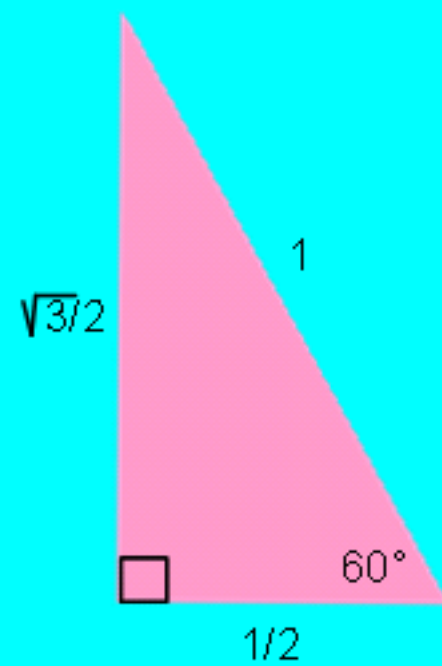
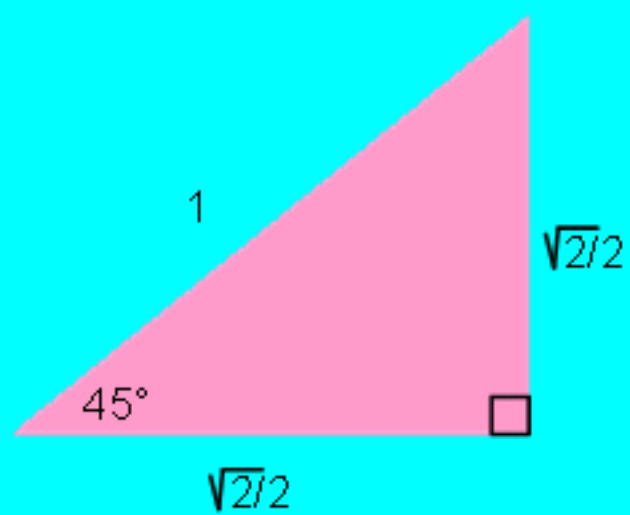


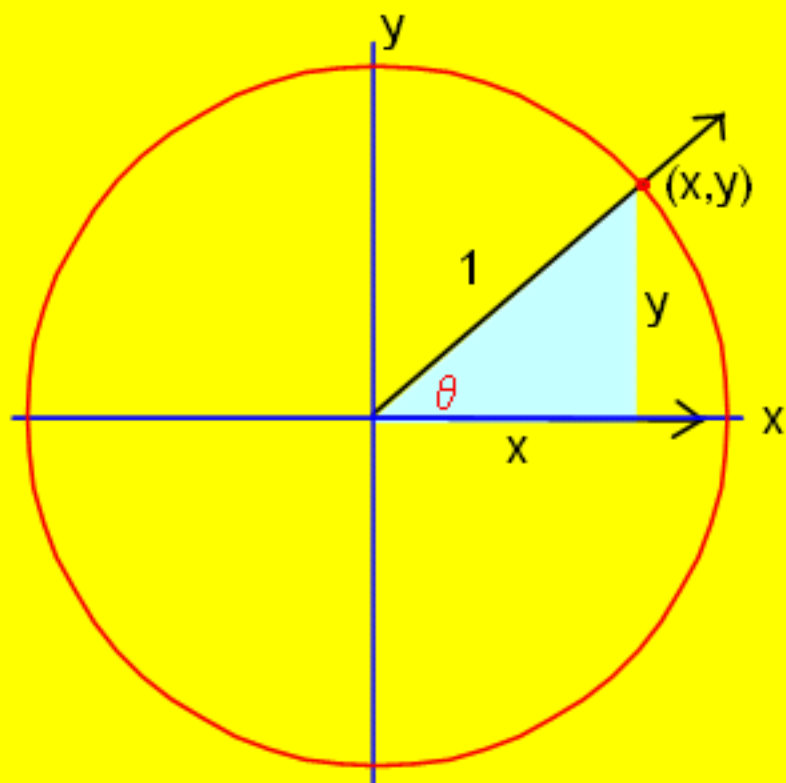
BELL ACTIVITY: Give unknown measures of the triangles:



## Trig Lesson 5.3--The Unit Circle

NOW...on to the unit circle...an AMAZING tool that we will use **all semester** to learn trig

If you take a circle with radius **1 unit** and place it on the xy coordinate plane you have what we call the "**unit circle**"



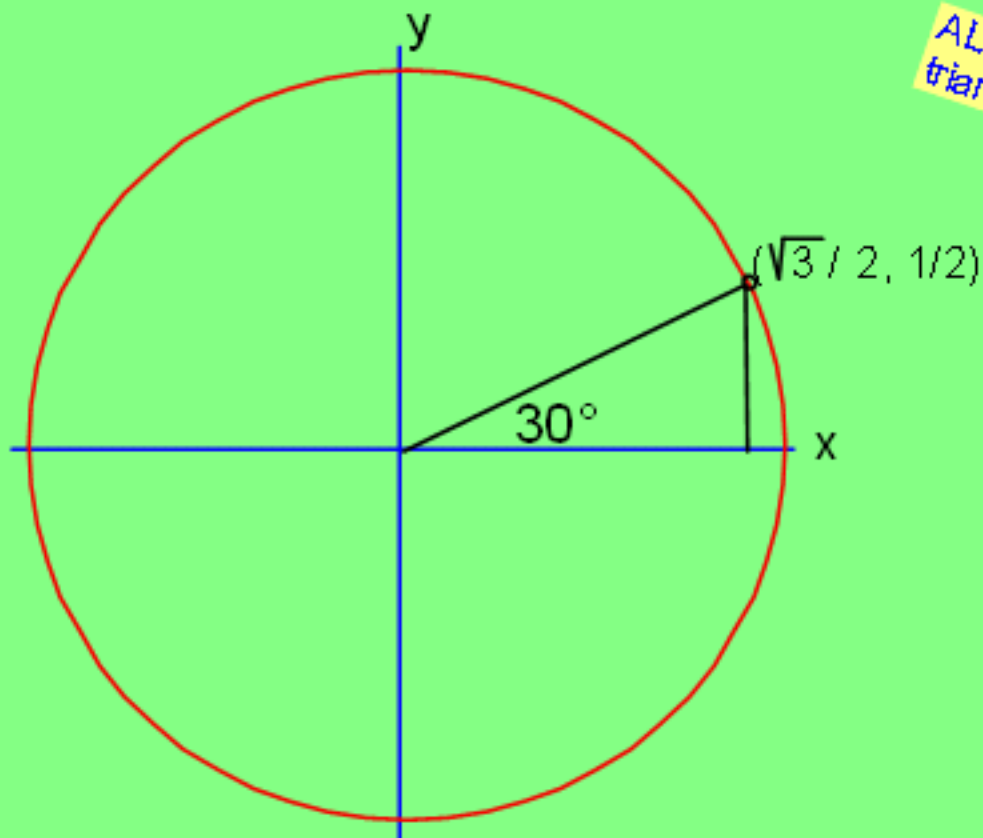
Remember: this only works in the UNIT circle...when  $r = 1$

$$\text{so } (x,y) = (\cos\theta, \sin\theta)$$

Let's see how this works with some familiar angles and triangles!

$$\sin 30^\circ = \underline{\underline{1/2}}$$

$$\cos 30^\circ = \underline{\underline{\sqrt{3}/2}}$$



ALWAYS draw the triangle to the X-AXIS!

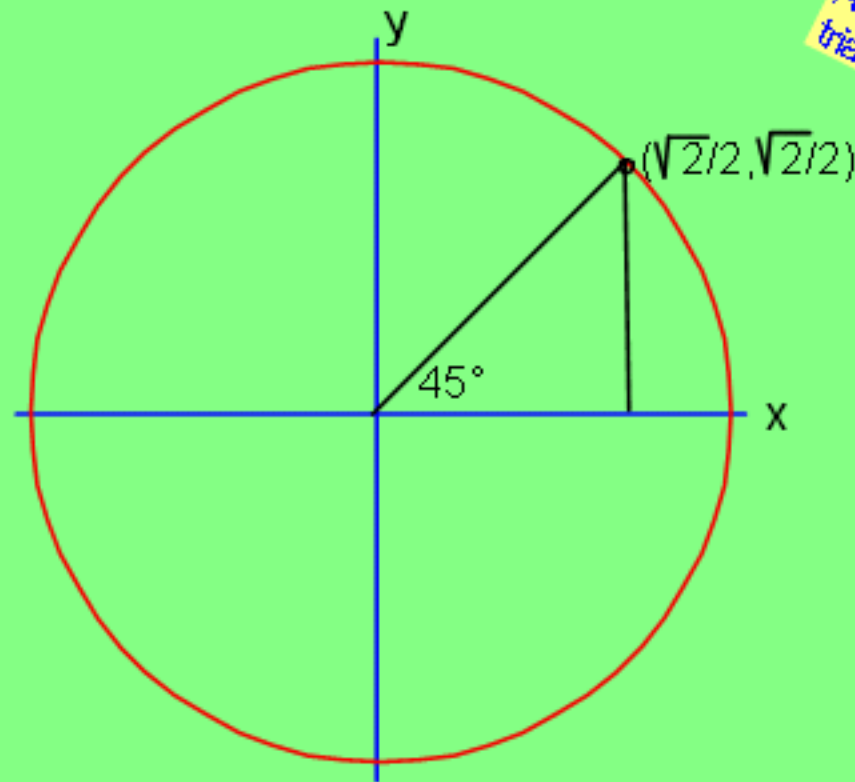
Always write the ordered pair on your circle...I want to see it!

Hey! Let's check these with a calculator...you do it...NOW! [http://www.calculator.com/calcs/calc\\_sci.html](http://www.calculator.com/calcs/calc_sci.html)

Let's see how this works with some familiar angles and triangles!

$$\sin 45^\circ = \underline{\frac{\sqrt{2}}{2}}$$

$$\cos 45^\circ = \underline{\frac{\sqrt{2}}{2}}$$



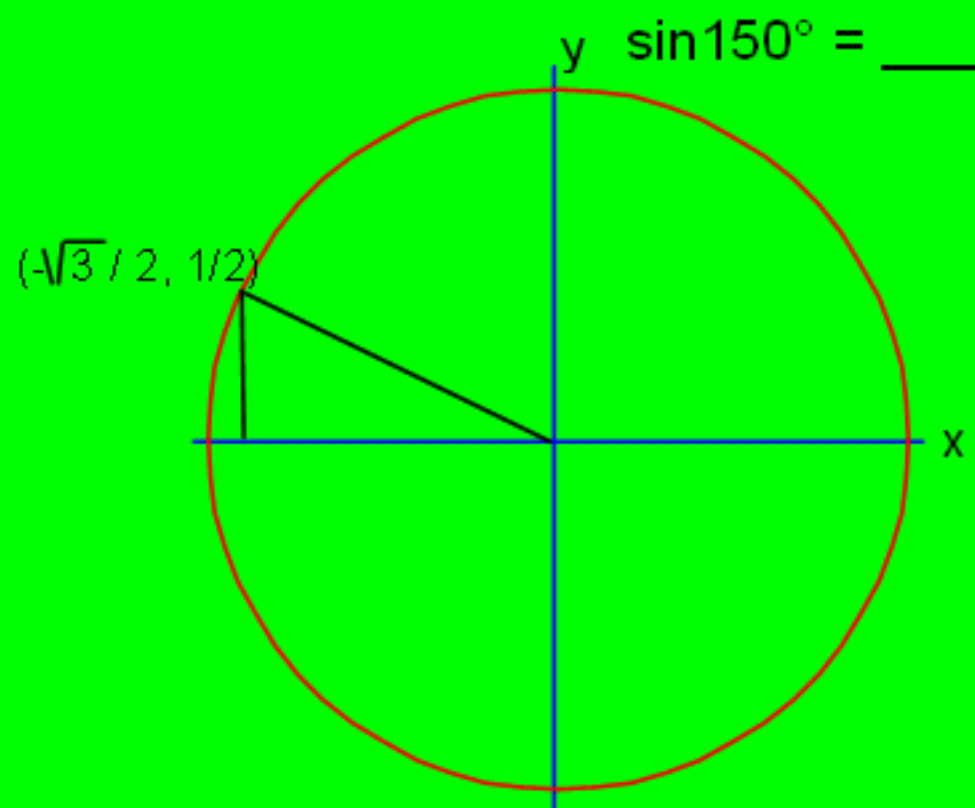
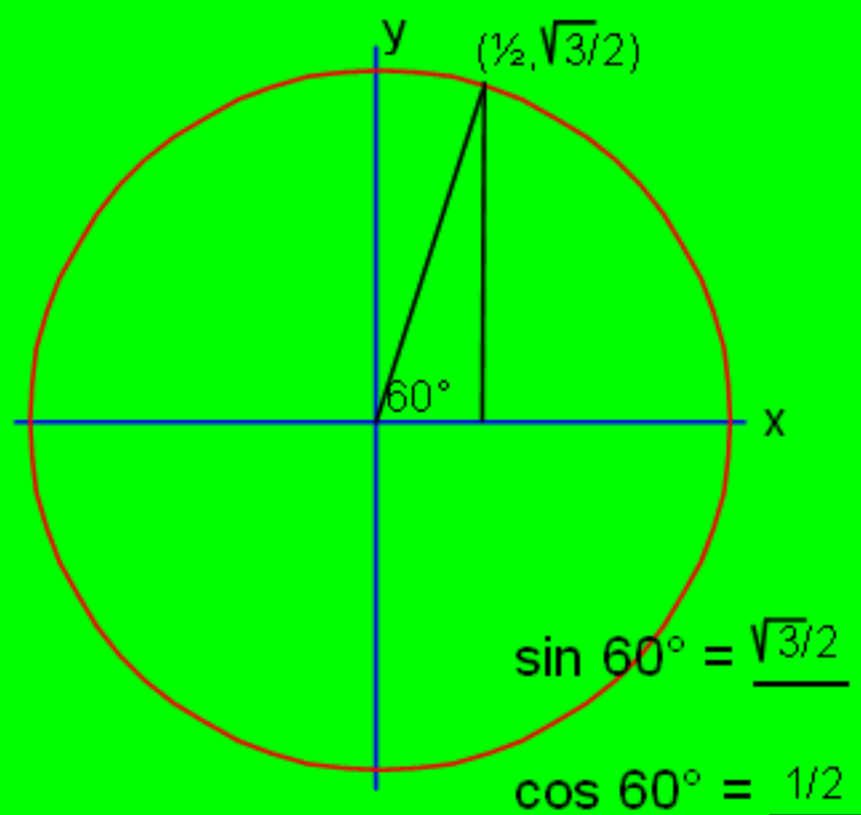
ALWAYS draw the triangle to the X-AXIS!

Always write the ordered pair on your circle...I want to see it!

Hey! Let's check these with a calculator..you do it...NOW!

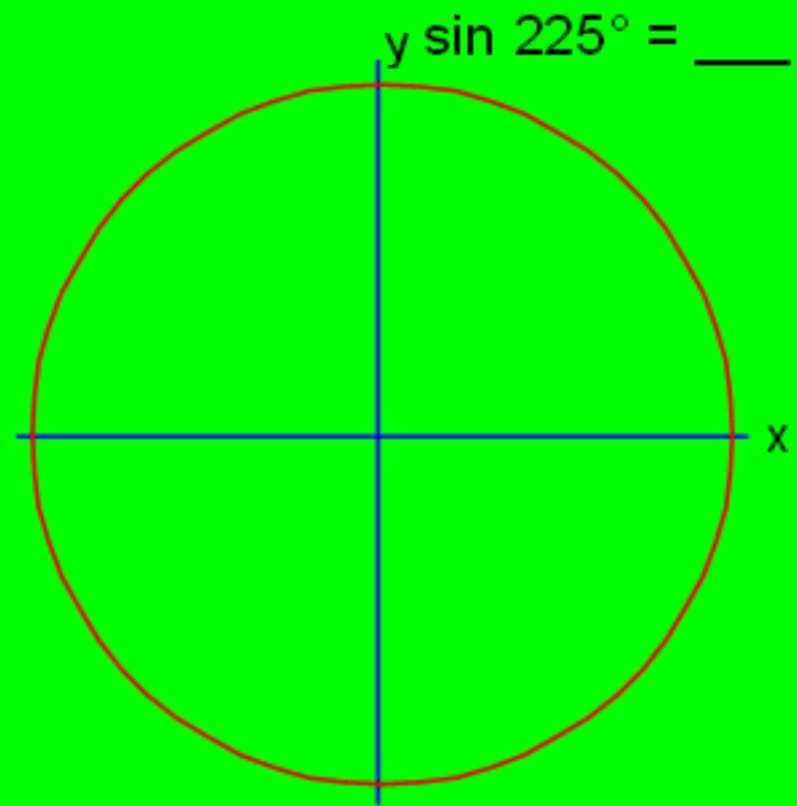
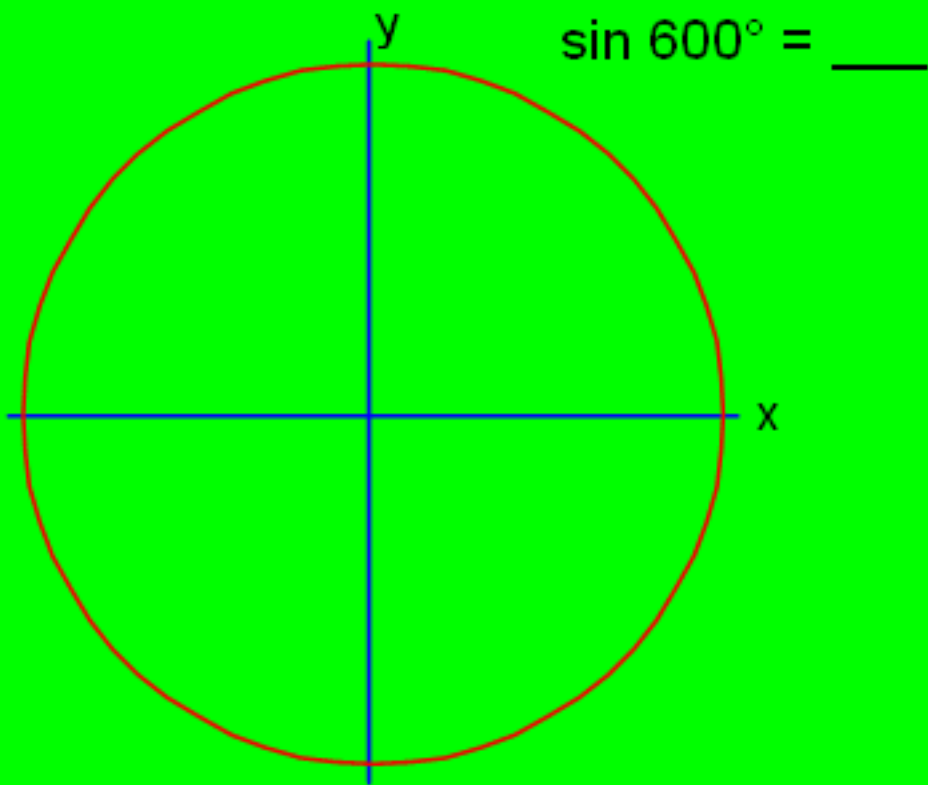
calculator

Always write the ordered pair on your circle...I want to see it!



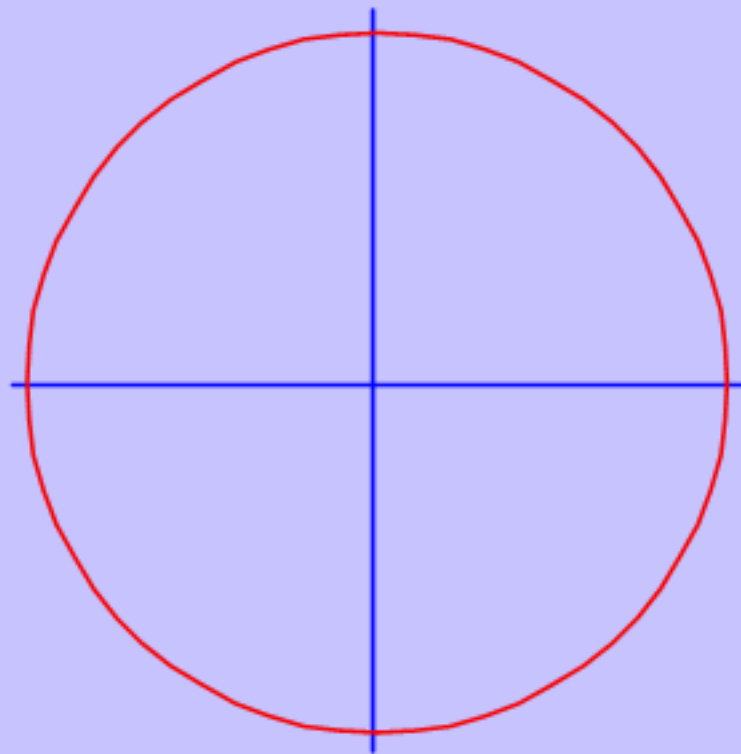
Whoa! This one is not acute!  
What WILL we do?!  
...just use the reference angle!

Always write the ordered pair on your circle...I want to see it!



**What about  $\tan\theta$ ?**

$$\tan x = y/x$$

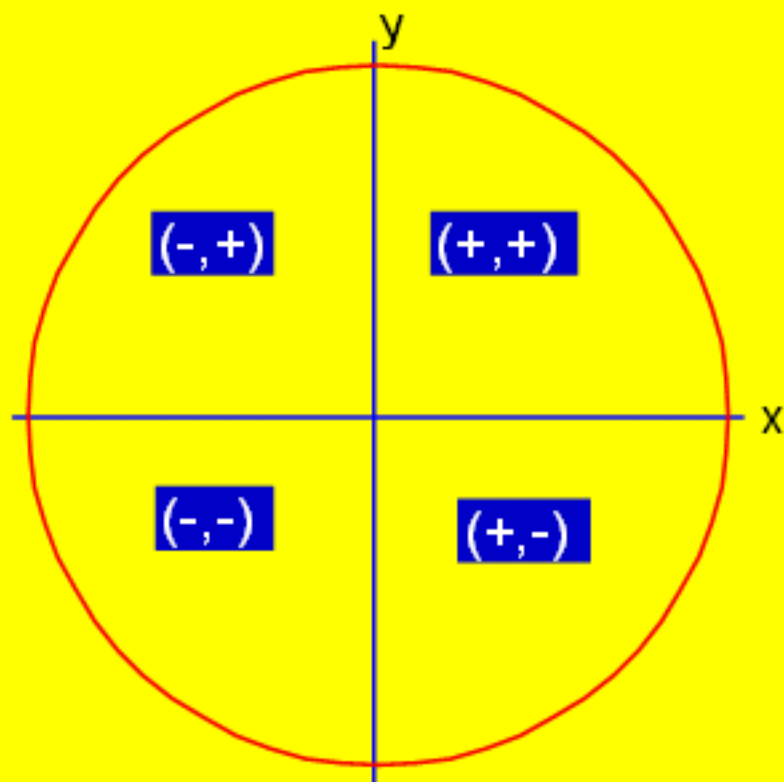


**What about the reciprocal functions?**

**Don't memorize it..just think through it! (It's too much to memorize)**

**NOTICE the signs in each quadrant**

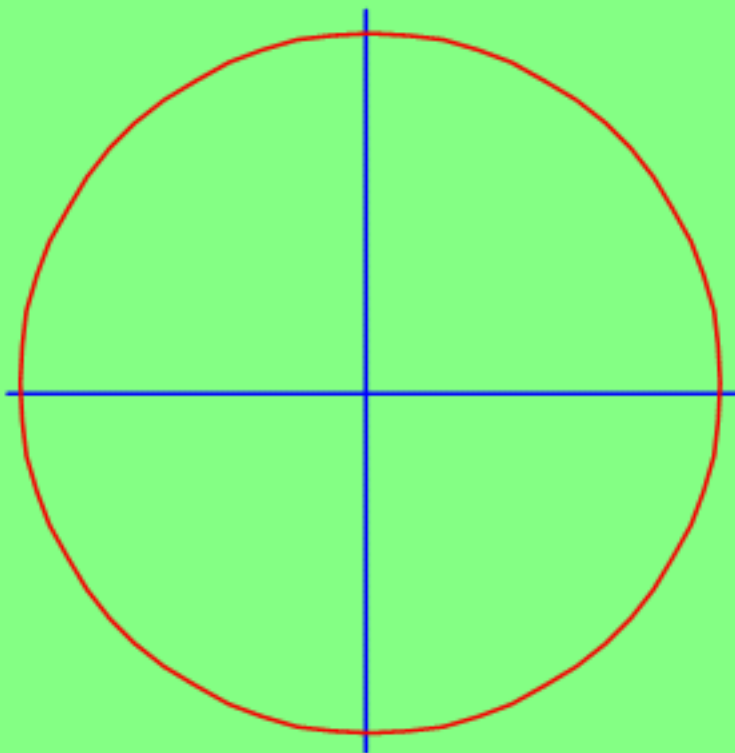
**A**ll  
**S**tudents  
**T**ake  
**C**alculus



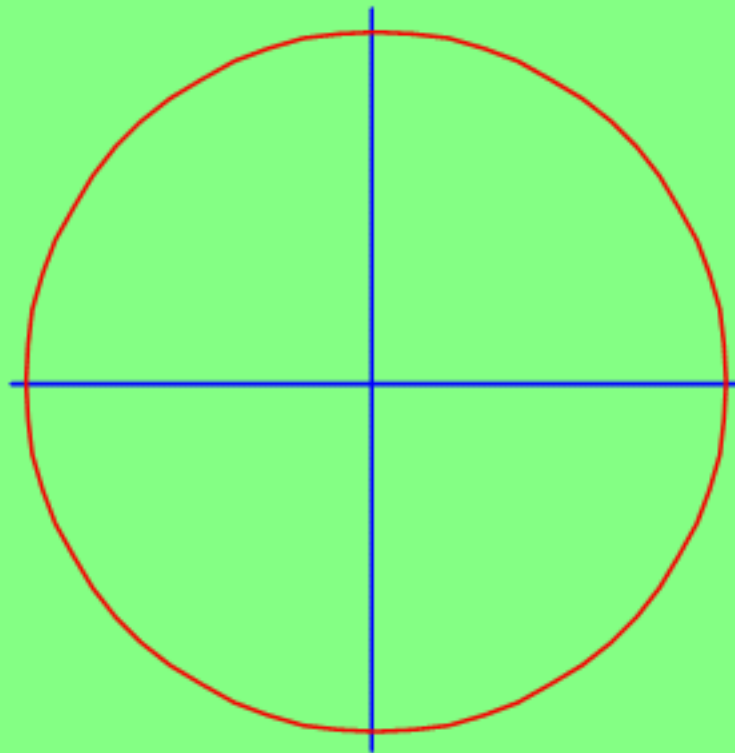
S	A
T	C

**This little piece of information will help you TONS in the future....use it!**

Always write the ordered pair on your circle...I want to see it!

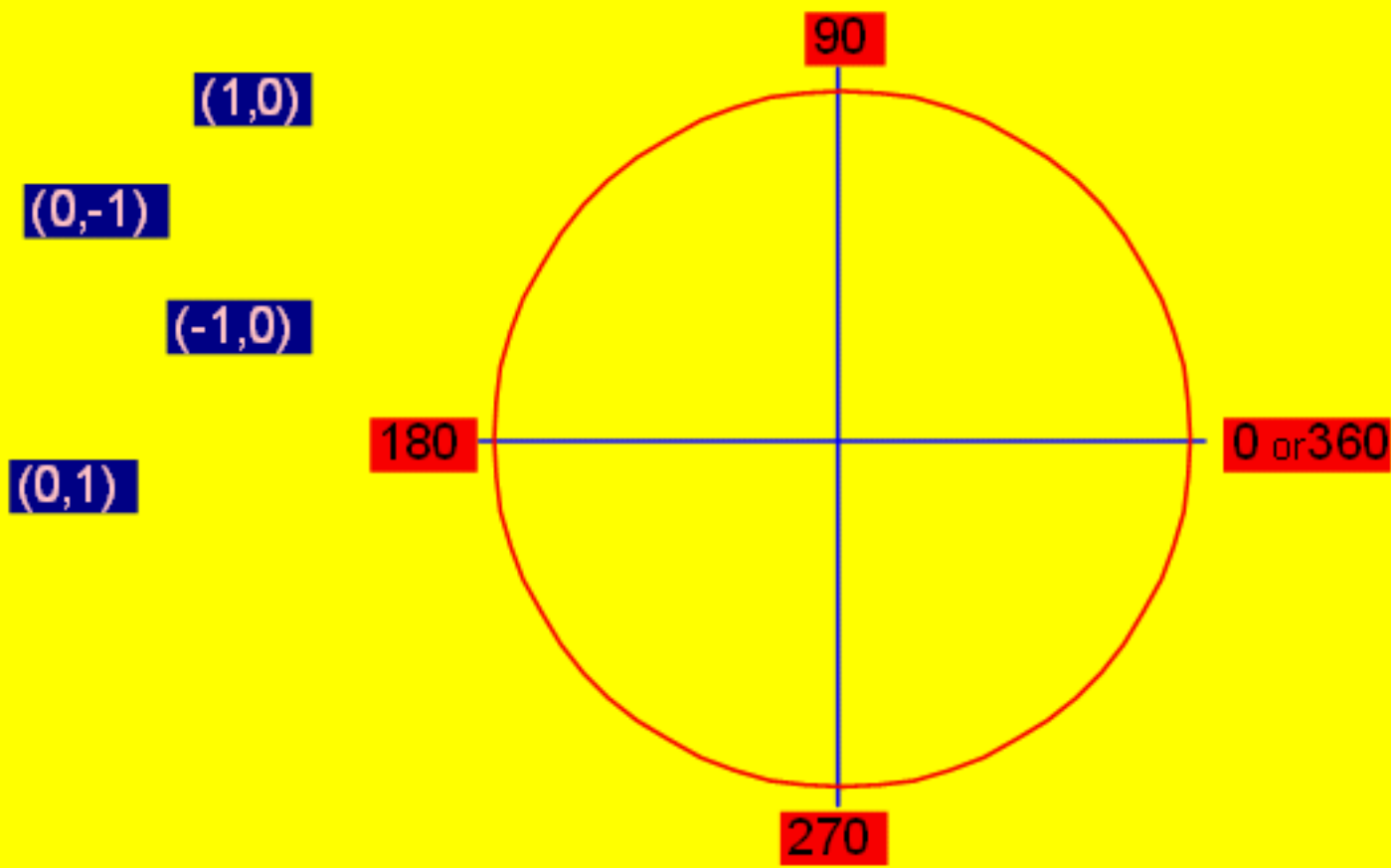


$\tan(-135^\circ) = \underline{\hspace{2cm}}$



$\csc 660^\circ = \underline{\hspace{2cm}}$

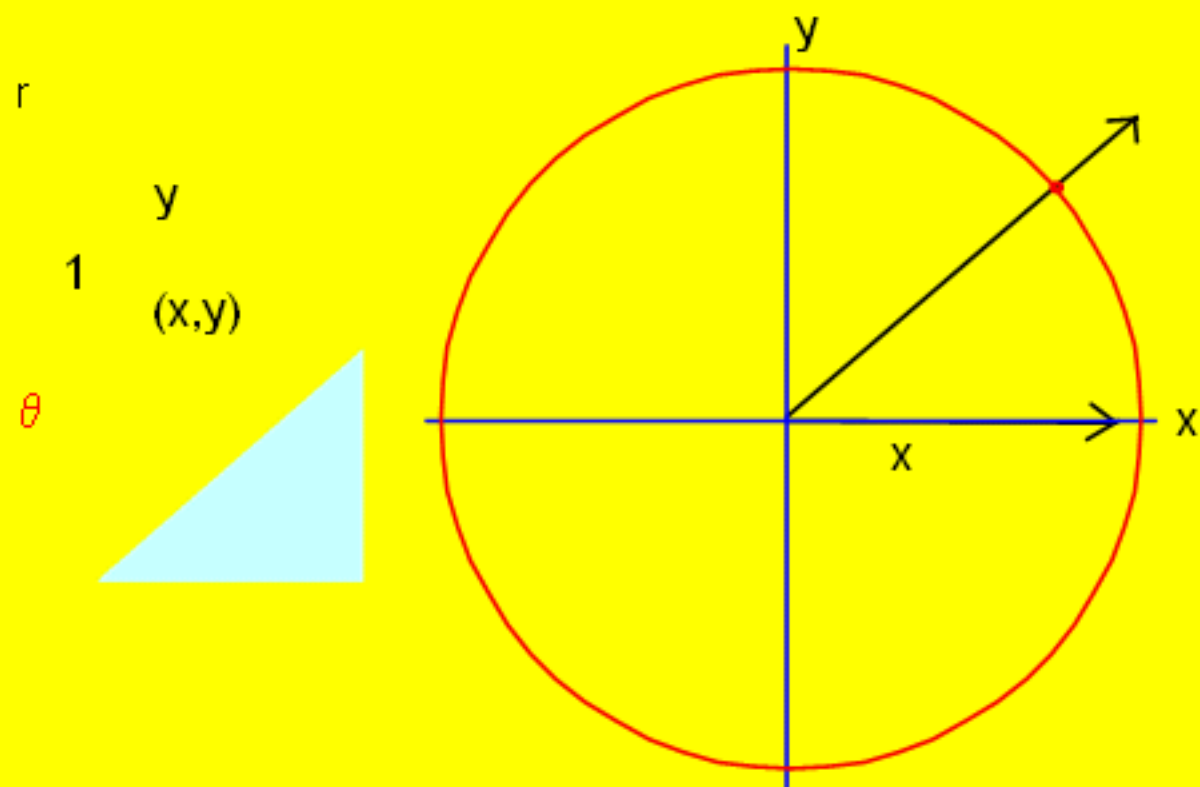
What about the **QUADRANTAL** angles?? ( $0^\circ, 90^\circ, 180^\circ, 270^\circ, 360^\circ$ )



$\sin 90^\circ =$   
 $\cos 270^\circ =$   
 $\tan(-180^\circ) =$   
 $\csc 180^\circ =$   
 $\sec 360^\circ =$   
 $\cot 90^\circ =$

1  
undefined 1 0 -1  
0 -1 0  
undefined

See ex 4 and 5 in book...caution: this is NOT in the unit circle!



# 5.3 even

$$\begin{aligned} \textcircled{30} \quad \sin\theta &= -\frac{3}{5} & \csc\theta &= -\frac{5}{3} \\ \cos\theta &= -\frac{4}{5} & \sec\theta &= -\frac{5}{4} \\ \tan\theta &= \frac{3}{4} & \cot\theta &= \frac{4}{3} \end{aligned}$$

$$\begin{aligned} \textcircled{32} \quad \sin\theta &= 0 & \csc\theta &= \text{und.} \\ \cos\theta &= 1 & \sec\theta &= 1 \\ \tan\theta &= 0 & \cot\theta &= \text{und.} \end{aligned}$$

$$\begin{aligned} \textcircled{34} \quad \sin\theta &= \frac{-3\sqrt{34}}{34} & \csc\theta &= -\frac{\sqrt{34}}{3} \\ \cos\theta &= \frac{5\sqrt{34}}{34} & \sec\theta &= \frac{\sqrt{34}}{5} \\ \tan\theta &= -\frac{3}{5} & \cot\theta &= -\frac{5}{3} \end{aligned}$$

$$\begin{aligned} \textcircled{38} \quad \sin\theta &= -\frac{5}{13} & \csc\theta &= -\frac{13}{5} \\ \cos\theta &= -\frac{12}{13} & \sec\theta &= -\frac{13}{12} \\ \tan\theta &= \frac{5}{12} & \cot\theta &= \frac{12}{5} \end{aligned}$$

$$\begin{aligned} \textcircled{40} \quad \sin\theta &= -\frac{1}{5} & \csc\theta &= -5 \\ \cos\theta &= \frac{2\sqrt{6}}{5} & \sec\theta &= \frac{5\sqrt{6}}{12} \\ \tan\theta &= -\frac{\sqrt{6}}{12} & \cot\theta &= -2\sqrt{6} \end{aligned}$$

$$\begin{aligned} \textcircled{42} \quad \sin\theta &= -\frac{\sqrt{6}}{3} & \csc\theta &= -\frac{\sqrt{6}}{2} \\ \cos\theta &= \frac{\sqrt{3}}{3} & \sec\theta &= \sqrt{3} \\ \tan\theta &= -\sqrt{2} & \cot\theta &= -\frac{\sqrt{2}}{2} \end{aligned}$$

$$\textcircled{44} \quad \frac{\sqrt{3}}{3}$$

$\textcircled{36}$  value of sine in Q2 is opposite of value in Q.4

**Build unit circle @  
promethean board**

**Unit Circle special angles**

