AA8-2   Name _____
Creating a unit circle with points

A. Marking central angles and points on the unit circle:

- Test your memory. Writing small and neatly, label all of the angles (in degrees) on the unit circle that you can remember. Then use your investigation AA8-1 to fill in the rest.

- Think back to AA8-0 when you found the lengths of the sides of the special right triangles. INSIDE the two triangles, write the lengths of the sides. Then cut them out.

- Using your triangles, set the 30^0 angle on the positive x-axis. Using the lengths of the triangle legs, what is the coordinate of the point on the edge of the circle. _____.
  Label it.

    o Do the same thing for the 45^0 and 60^0 angles.

- Move to the quadrant II. Use the 30^0 triangle and set it on the negative x-axis. Find and label the coordinate. Be careful. Think about each coordinate the when x and y are positive and negative.

    o Do the same thing for the 45^0 and 60^0 triangles.

- Fill in all four quadrants.

- Go back through and mark the radian measures on the unit circle. Try it by memory first.

B. Cosine and Sine values:

Cosine is defined as the ratio between the lengths of the adjacent leg and the hypotenuse on a right triangle. Sine is the ratio between the lengths of the opposite leg and hypotenuse.

In other words: $\cos \alpha = \frac{adj}{hyp}$ and $\sin \alpha = \frac{opp}{hyp}$

1. Explain why each point (x,y) that you wrote on the unit circle is $(\cos \alpha, \sin \alpha)$:

Now, complete the assignment, then return to finish the investigation of tangent.

<u>Extend your knowledge</u>

We know **tan** α = $\frac{opp}{adj}$ and on a unit circle the length of the **opposite leg** = **sin** α and the length

of the **adjacent leg** = **cos** α.   Therfore, **tan** α = $\frac{opp}{adj}$ = $\frac{sin\ \alpha}{cos\ \alpha}$ = $\frac{rise}{run}$.

In other words, on the unit circle, tangent is the _____ of the radius at the given angle.

1)   Simplify: $\frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}}$ =

       Simplify: $\frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}}$ =

2) Fill in the table at right for all angles given.

Angle	Radians	cos(a)	sin(a)	tan(a)
0	0			
	$\frac{\pi}{6}$			
	$\frac{\pi}{4}$			
	$\frac{\pi}{3}$			
	$\frac{\pi}{2}$			
	π			
	$\frac{3\pi}{2}$			

For which angles is the tangent undefined? _____

Why?