Algebra II/Trig B                                Name ___________________________

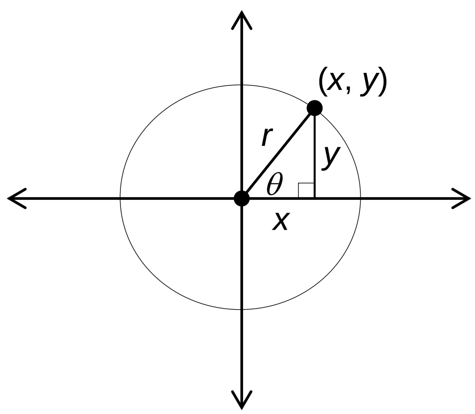
**Finding the Trigonometric Function of Any Angle – Day 2**
**Module 3, Unit 6, Lesson 5**

**<u>Trigonometric Functions of Any Angle</u>**
Let $\theta$ be any angle in standard position and let $P=(x,y)$ be a point on the terminal side of $\theta$. If $r=\sqrt{x^2+y^2}$ is the distance from $(0,0)$ to a point on the circle. Then the trig functions of any angle are:

$$\sin=\frac{y}{r} \qquad \csc=\frac{r}{y}$$

$$\cos=\frac{x}{r} \qquad \sec=\frac{r}{x}$$

$$\tan=\frac{y}{x} \qquad \cot=\frac{x}{y}$$



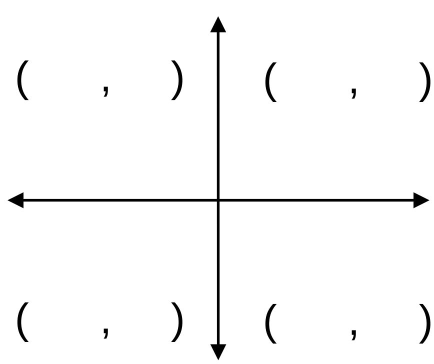

**<u>Finding Trigonometric Functions Given a Point</u>**
1. Plot the point.
2. Connect the point back to the origin.
3. Connect the point to the *x*-axis.
4. Label the directional distances.
5. Use Pythagorean Theorem to find the missing hypotenuse.

**<u>Example 1:</u>** Let $P=(-3,4)$ be a point on the terminal side of $\theta$. Find each of the six trig functions of $\theta$.

**<u>Example 2:</u>** Let $P = (-2, -1)$ be a point on the terminal side of $\theta$. Find each of the six trig functions of $\theta$.

**<u>Example 3:</u>** Let $P = (7, -24)$ be a point on the terminal side of $\theta$. Find each of the six trig functions of $\theta$.

**<u>Where the Trig Functions are Positive</u>**




**<u>Example 4:</u>** If tan θ < 0 and cos θ > 0, name the quadrant in which angle θ lies.

**Example 5:** If cos θ < 0 and sin θ > 0, name the quadrant in which angle θ lies.

**Example 6:** If sec θ < 0 and csc θ < 0, name the quadrant in which angle θ lies.

**Example 7:** Given $\tan\theta = -\frac{2}{3}$ and sin θ > 0, find the remaining five trigonometric functions.

**Example 8:** Given $\tan\theta = \frac{5}{12}$ and cos θ < 0, find the remaining five trigonometric functions.

**Example 9:** Given $\cos\theta = -\frac{3}{5}$ and cot θ < 0, find the remaining five trigonometric functions.

**Example 9:** John was asked to find the sin 210$^{o}$. He followed the following steps.

1. Sketch the angle and found it to be in quadrant III.
2. Found the reference angle by subtraction: 210$^{o}$ – 180$^{o}$ = 30$^{o}$
3. Used his understanding of the 30$^{o}$ – 60$^{o}$ – 90$^{o}$ triangle to find sin 30$^{o}$ = $\frac{1}{2}$.
4. Conclude that since the reference angles for 210$^{o}$ is 30$^{o}$, then sin 210$^{o}$ = $\frac{1}{2}$.

Do you agree or disagree with John? Explain.