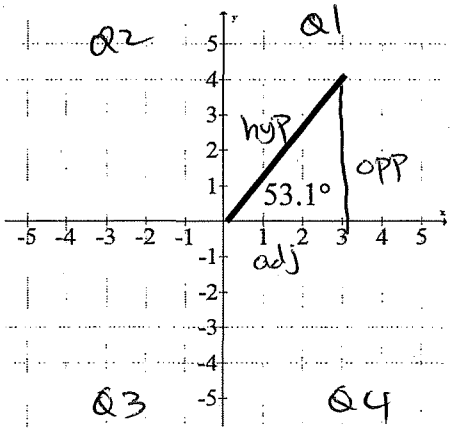
Name: _____ Date: _____

Lesson 1.4 – Trigonometric Ratios for Obtuse Triangles

- Learning Goals: Investigate connections between primary trigonometric ratios of acute angles and obtuse angles. Determine the values of the sine ratio, cosine ratio, and tangent ratio for obtuse angles.

Cartesian coordinate system is divided into **4 quadrants.**



- Label the quadrants on the grid
- Identify the opposite, adjacent and hypotenuse of angle θ
- What is the x-coordinate of point P? 3
  What is the y-coordinate of point P? 4
- Write the 3 trigonometric ratios

$a^2+b^2=c^2$

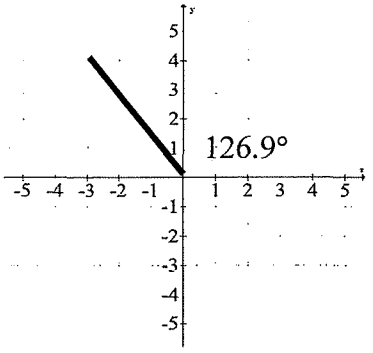
$3^2+4^2=c^2$

$c^2=25$

$c=5$

Sin 53.1 = $\frac{4}{5}$ Cos 53.1 = $\frac{3}{5}$ Tan 53.1 = $\frac{4}{3}$

Notice that the <u>length of the adjacent side is the x-coordinate</u> and the <u>length of the opposite side is the y-coordinate</u>. We can use this idea to find the trigonometric ratios of obtuse angles.



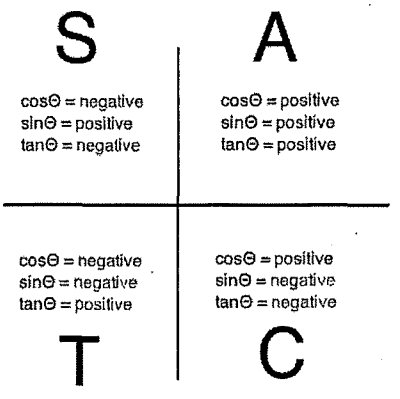
Sin 126.9 = $\frac{4}{5}$ Cos 126.9 = $-\frac{3}{5}$ Tan 126.9 = $-\frac{4}{3}$

In general: Sinθ is positive in Q1 and Q2
cosθ, tanθ is positive in Q1 but they are both negative in Q2

Where are sin, cos and tan positive? This is called the CAST rule:

Notice: For an angle between 0° and 180°,

- If cos or tan are positive the angle is Q1
- If cos or tan are negative the angle is Q2
- If sin is positive the angle could be Q1 or Q2



There are always two angles that could give us the same sin ratio. When finding the angle, we must report **both** possibilities.