

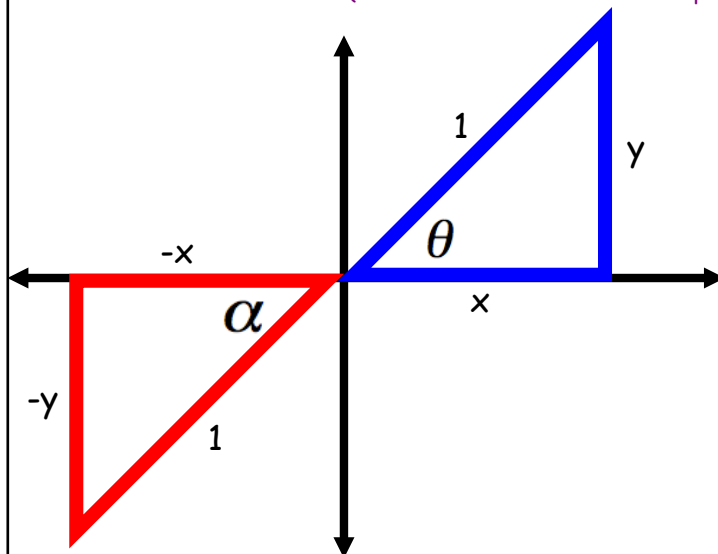
The Unit Circle

The Unit Circle is created by multiples of 30° , 45° , 60° , and 90° or $\frac{\pi}{6}$, $\frac{\pi}{4}$, $\frac{\pi}{3}$, $\frac{\pi}{2}$ angles

We only need these values to find
ALL of the values on the Unit Circle.

Quick Review of the Trig Ratios

(now in context of the Cartesian plane)



$$\sin \theta =$$

$$\cos \theta =$$

$$\tan \theta =$$

$$\sin \alpha =$$

$$\cos \alpha =$$

$$\tan \alpha =$$

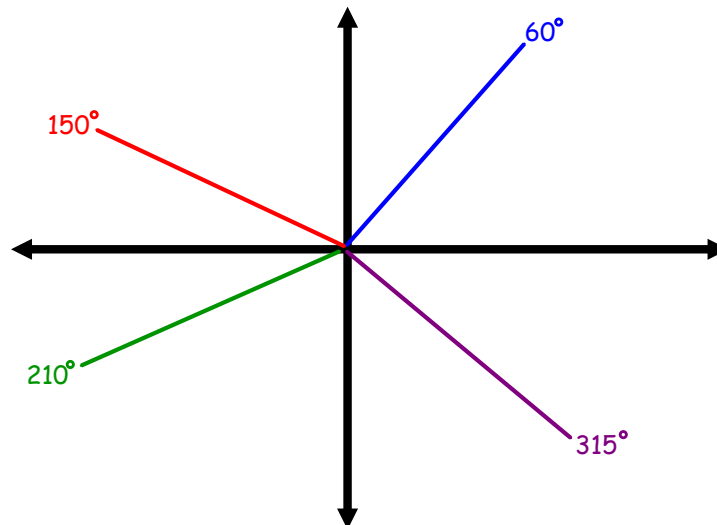
Why do we only need some angles?

Sketch: 120°

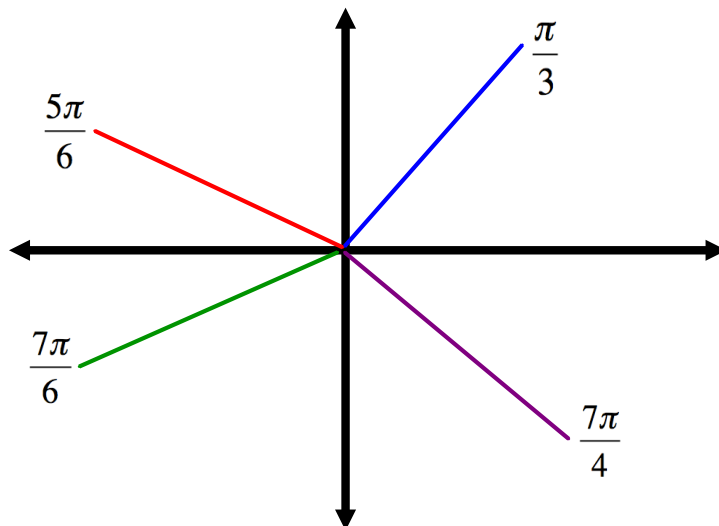
Can we set up a right triangle with an angle of 120° ?

Where could we draw an angle that *CAN* be used in a right triangle but is related to the original angle?

Find the reference angle!



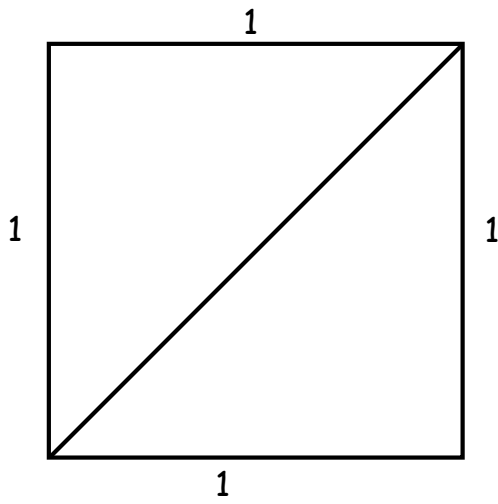
Find the reference angle!



Find the reference angles for
the angles on your homework!

Remember: 45°-45°-90° Triangle

$$\frac{\pi}{4} \quad \frac{\pi}{4} \quad \frac{\pi}{2}$$



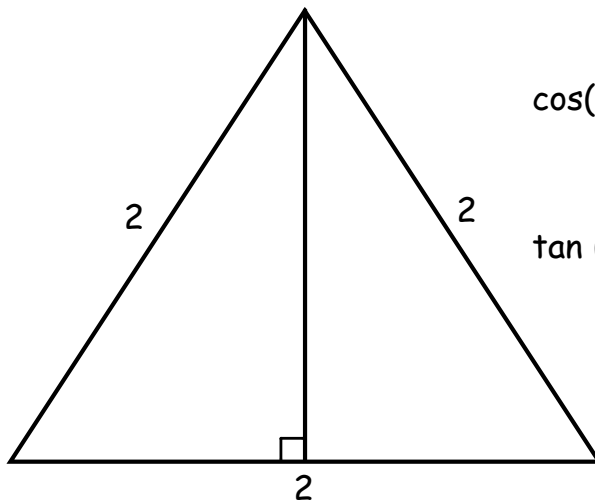
$$\sin(45^\circ) =$$

$$\cos(45^\circ) =$$

$$\tan(45^\circ) =$$

Remember: 30°-60°-90° Triangle

$$\frac{\pi}{6} \quad \frac{\pi}{3} \quad \frac{\pi}{2}$$



$$\sin(30^\circ) =$$

$$\sin\left(\frac{\pi}{3}\right) =$$

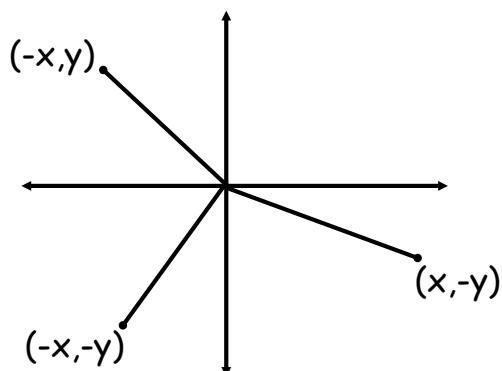
$$\cos\left(\frac{\pi}{6}\right) =$$

$$\cos(60^\circ) =$$

$$\tan(30^\circ) =$$

$$\tan\left(\frac{\pi}{3}\right) =$$

What happens when we move out of the first quadrant?



Ratios are the **SAME**, the signs change depending on the quadrant!

So how do we do this with ANY angle?

1. Draw a sketch of where the angle is in the coordinate plane.

$$\sin(45^\circ)$$

2. Create a triangle to the x-axis.

3. Determine the reference angle, and label the sides of the triangle.

$$\cos\left(\frac{\pi}{6}\right)$$

4. Find the value of the trig ratio!

$$\tan\left(\frac{\pi}{3}\right)$$

$$\sin(135^\circ) =$$

$$\sin\left(\frac{2\pi}{3}\right) =$$

$$\cos\left(\frac{3\pi}{4}\right) =$$

$$\cos(150^\circ) =$$

$$\tan\left(\frac{5\pi}{6}\right) =$$

$$\tan(120^\circ) =$$

$$\sin(300^\circ) =$$

$$\sin\left(\frac{5\pi}{4}\right) =$$

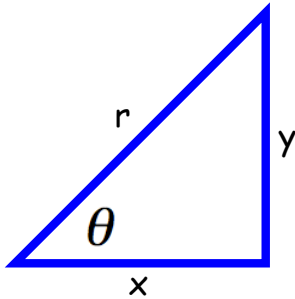
$$\cos\left(\frac{5\pi}{3}\right) =$$

$$\tan(240^\circ) =$$

What about the angles on the axis?

These are called your quadrantal angles

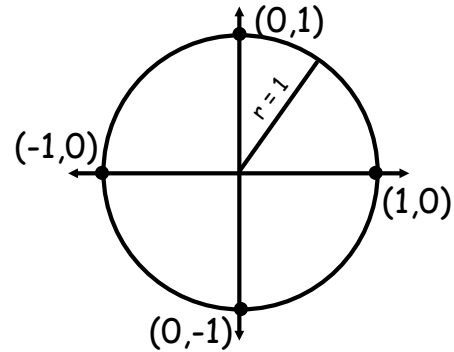
Remember our trig ratios in context of the Cartesian plane:



$$\sin \theta =$$

$$\cos \theta =$$

$$\tan \theta =$$



So what are the following:

$$\sin(270^\circ) =$$

$$\sin\left(\frac{\pi}{2}\right) =$$

$$\cos(\pi) =$$

$$\cos(360^\circ) =$$

Homework

Unit Circle Worksheet

(practice method, don't copy from notes!)