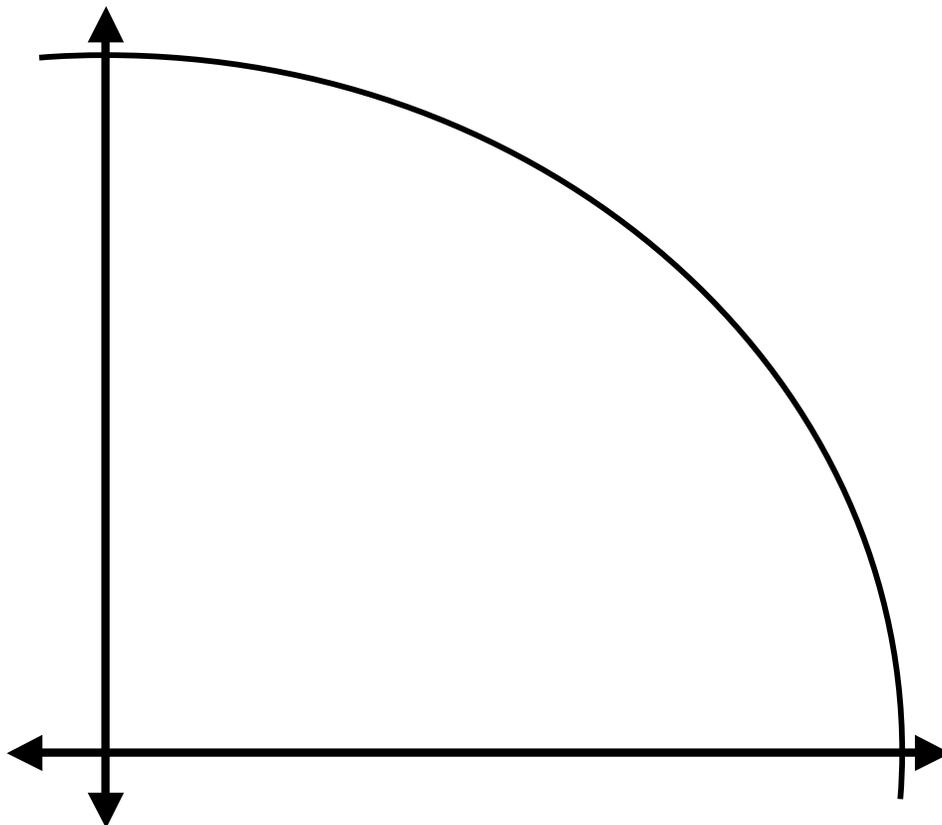


The unit circle is a circle centered about the origin with a radius of 1. We use the unit circle to help us evaluate trig functions of special values. These 16 values are created from special right triangles and the x and y axes. Let's look at quadrant I of the unit circle.



Six Trig Functions of the Unit Circle

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} = \frac{y}{r}$$

$$\csc \theta = \frac{\text{hyp}}{\text{opp}} = \frac{r}{y}$$

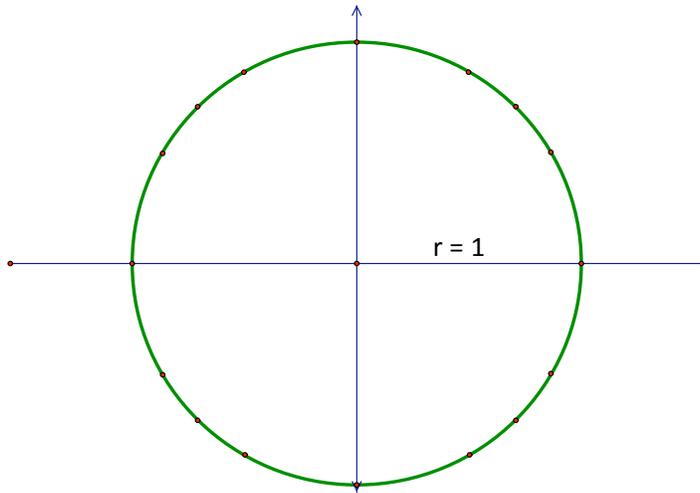
$$\cos \theta = \frac{\text{adj}}{\text{hyp}} = \frac{x}{r}$$

$$\sec \theta = \frac{\text{hyp}}{\text{adj}} = \frac{r}{x}$$

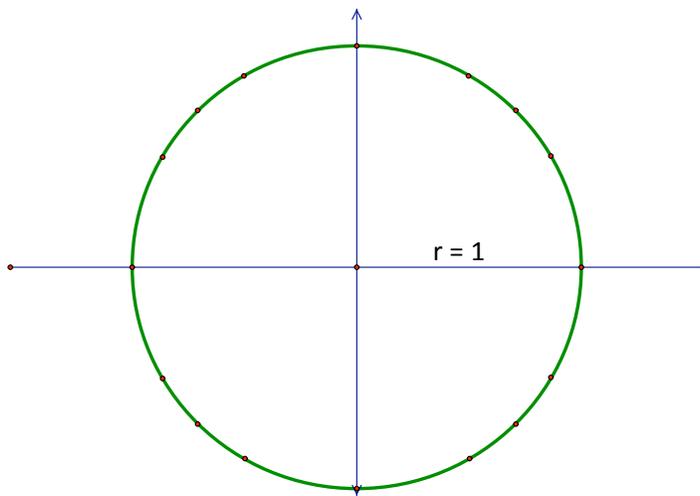
$$\tan \theta = \frac{\text{opp}}{\text{adj}} = \frac{y}{x}$$

$$\cot \theta = \frac{\text{adj}}{\text{opp}} = \frac{x}{y}$$

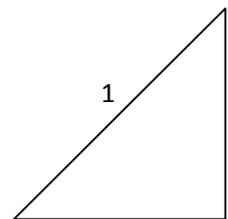
Step 1: Quadrantal Angles



Step 2: $\frac{\pi}{4}$ family

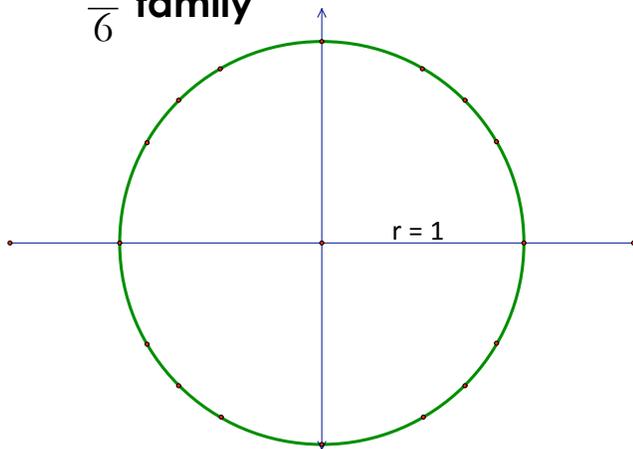


Remember

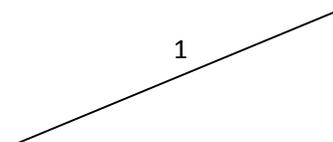


Step 3:

$\frac{\pi}{6}$ family

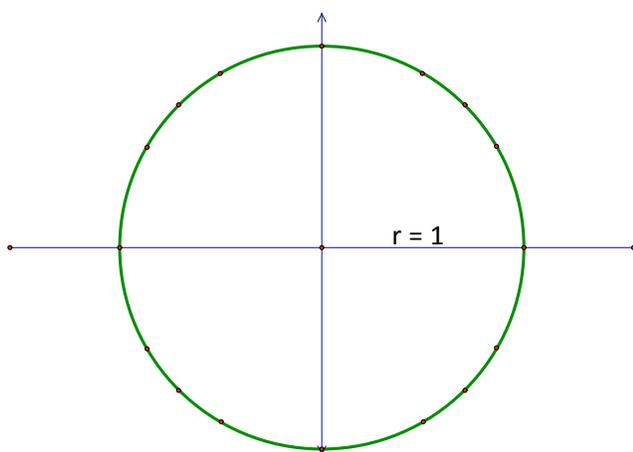


Remember

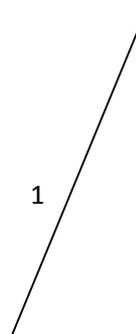


Step 4:

$\frac{\pi}{3}$ family



Remember



Step 5: Trigonometric Functions:

Let t be a real number and let $P = (x, y)$ be the point on the unit circle that corresponds to t .

$$\sin t = y$$

$$\cos t = x$$

$$\tan t = \frac{y}{x}$$

$$\csc t = \frac{1}{y}$$

$$\sec t = \frac{1}{x}$$

$$\cot t = \frac{x}{y}$$

Finding the EXACT values of the 6 trigonometric functions.

Step 1: Find the angle on the unit circle.

Step 2: Use the ordered pair to find the sine or cosine (cosine, sine)

Step 3: Or use special special right triangles to find the sine or cosine.
Sine is vertical and cosine is horizontal.

Step 4: Find tangent by $\tan\theta = \frac{\sin\theta}{\cos\theta}$

a) $\cos\left(\frac{5\pi}{6}\right)$

b) $\tan(-45^\circ)$

c) $\sec\left(\frac{2\pi}{3}\right)$

d) $\sin(3\pi)$

e) $\cot(-120^\circ)$

f) $\csc(315^\circ)$

IMPORTANT VALUES: (shaded area is extremely important)

	sin	cos	tan	cot
0°				
30°				
45°				
60°				
90°				

The rest of the unit circle can be formed by reflecting quadrant one to the other three quadrants.

