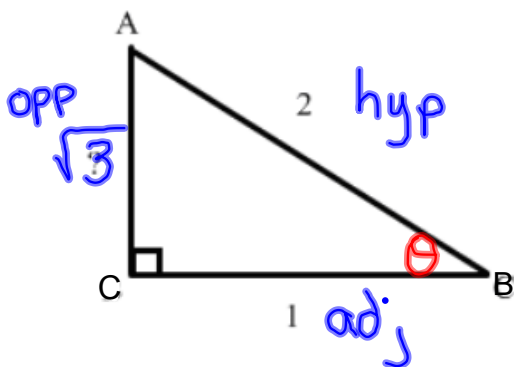


Trig Ratios:

$$\sin = \frac{\text{opp}}{\text{hyp}} \quad \cos = \frac{\text{adj}}{\text{hyp}} \quad \tan = \frac{\text{opp}}{\text{adj}} \quad \csc = \frac{\text{hyp}}{\text{opp}} \quad \sec = \frac{\text{hyp}}{\text{adj}} \quad \cot = \frac{\text{adj}}{\text{opp}}$$



Determine the 6 trig ratios for angle B, expressed as radicals in simplest form.

$$\begin{aligned} a^2 + b^2 &= c^2 \\ (1)^2 + b^2 &= (2)^2 \\ b^2 &= 4 - 1 \\ b &= \underline{\underline{\sqrt{3}}} \end{aligned}$$

$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\csc \theta = \frac{2 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{2\sqrt{3}}{3}$$

$$\cos \theta = \frac{1}{2}$$

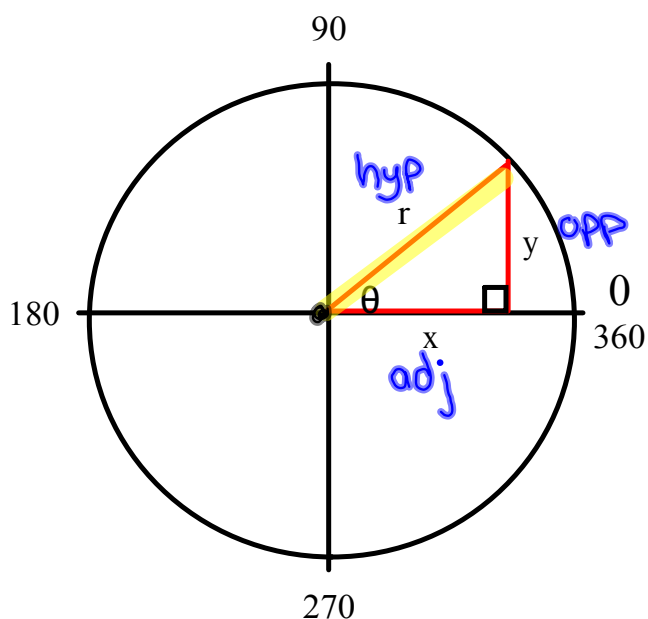
$$\sec \theta = \frac{2}{1} = 2$$

$$\tan \theta = \frac{\sqrt{3}}{1} = \sqrt{3}$$

$$\cot \theta = \frac{1 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{\sqrt{3}}{3}$$

## The Unit Circle

The unit circle has a radius of 1 unit and its center lies on the origin (0,0)



$$\begin{aligned} \sin \theta &= \frac{y}{r} & \csc \theta &= \frac{r}{y} \\ \cos \theta &= \frac{x}{r} & \sec \theta &= \frac{r}{x} \\ \tan \theta &= \frac{y}{x} & \cot \theta &= \frac{x}{y} \end{aligned}$$

Since the radius is equal to 1, then:

$$\sin \theta = \frac{y}{r} = \frac{y}{1} = y$$

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

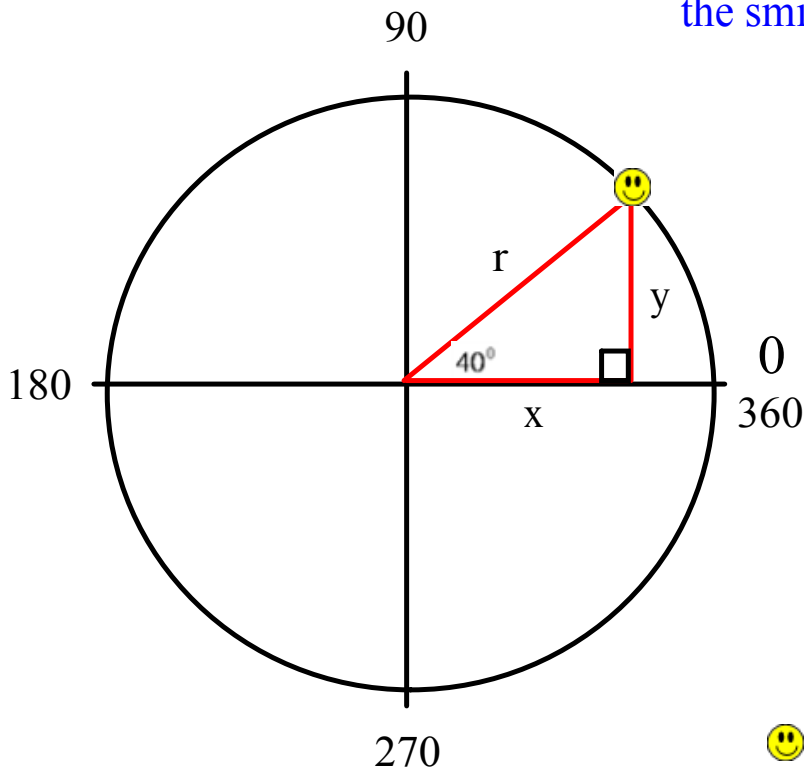
$$\cos \theta = \frac{x}{r} = \frac{x}{1} = x$$

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

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

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

To find the coordinates  $(x,y)$  of the smiley face given  $\theta = 40$



$$\cos\theta = x$$

$$\sin\theta = y$$

$$x = \cos 40^\circ = 0.7660$$

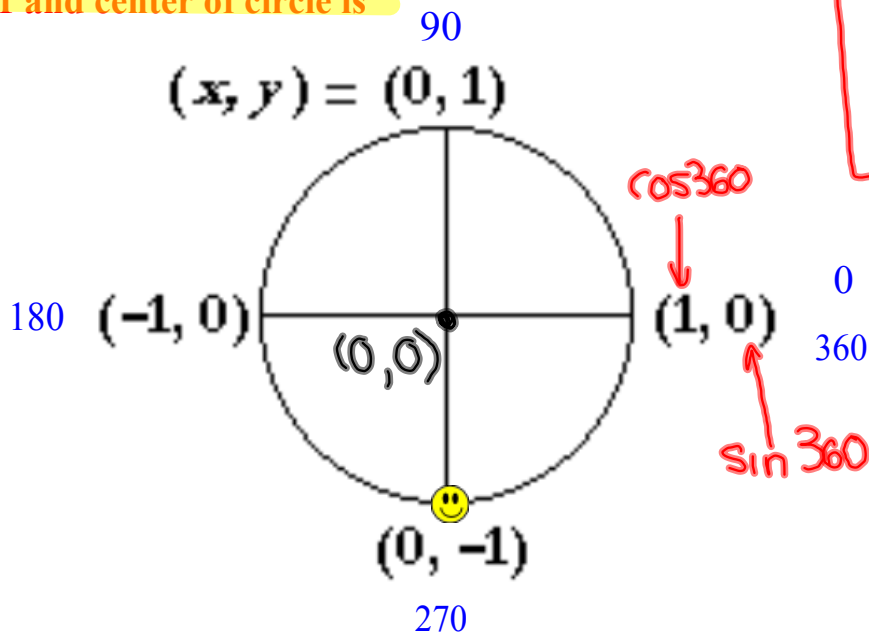
$$y = \sin 40^\circ = 0.6427$$

$$\text{😊 } (0.7660, 0.6427)$$

## Unit Circle

### Quadrantal Angles (Multiples of $90^\circ$ )

radius = 1 and center of circle is at (0,0)



Recall from last unit!

	$0^\circ$	$90^\circ$	$180^\circ$	$270^\circ$	$360^\circ$
sin (y)	0	1	0	-1	0
cos (x)	1	0	-1	0	1
tan (y/x)	0	undefined	0	undefined	0

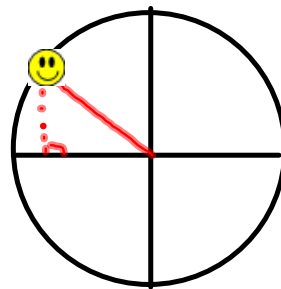
$(x,y)$

Find the coordinates of the end of the terminal arm on the unit circle for the following angles

Remember:

$$\cos \theta = x$$

$$\sin \theta = y$$



1)  $150^\circ$

$$x = \cos 150^\circ = -0.8660$$

$$y = \sin 150^\circ = 0.5$$

$$(-0.8660, 0.5)$$

2)  $70^\circ$

$$x = \cos 70^\circ = 0.3420$$

$$y = \sin 70^\circ = 0.9396$$

$$(0.3420, 0.9396)$$

# Homework