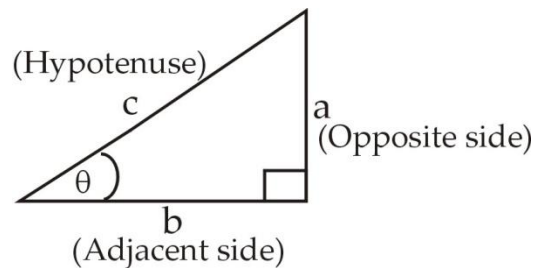


## TRIGONOMETRIC FUNCTIONS



Function Name	Abbreviation	Value	Ratio
sine of $\theta$	$\sin \theta$	$\frac{a}{c}$	$\frac{\text{opposite}}{\text{hypotenuse}}$
cosine of $\theta$	$\cos \theta$	$\frac{b}{c}$	$\frac{\text{adjacent}}{\text{hypotenuse}}$
tangent of $\theta$	$\tan \theta$	$\frac{a}{b}$	$\frac{\text{opposite}}{\text{adjacent}}$
cosecant of $\theta$	$\csc \theta$	$\frac{c}{a}$	$\frac{\text{hypotenuse}}{\text{opposite}}$
secant of $\theta$	$\sec \theta$	$\frac{c}{b}$	$\frac{\text{hypotenuse}}{\text{adjacent}}$
cotangent of $\theta$	$\cot \theta$	$\frac{b}{a}$	$\frac{\text{adjacent}}{\text{opposite}}$

## FUNDAMENTAL IDENTITIES

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$

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

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

$$\cot \theta = \frac{1}{\tan \theta}$$

$$\sin^2 \theta + \cos^2 \theta = 1 \quad \tan^2 \theta + 1 = \sec^2 \theta \quad \cot^2 \theta + 1 = \csc^2 \theta$$

## COMPLEMENTARY ANGLES, COFUNCTIONS

$\theta$  (Degrees)

$\theta$  (Radians)

$$\sin \theta = \cos(90^\circ - \theta) \quad \sin \theta = \cos\left(\frac{\pi}{2} - \theta\right)$$

$$\cos \theta = \sin(90^\circ - \theta) \quad \cos \theta = \sin\left(\frac{\pi}{2} - \theta\right)$$

$$\tan \theta = \cot(90^\circ - \theta) \quad \tan \theta = \cot\left(\frac{\pi}{2} - \theta\right)$$

$$\cot \theta = \tan(90^\circ - \theta) \quad \cot \theta = \tan\left(\frac{\pi}{2} - \theta\right)$$

$$\csc \theta = \sec(90^\circ - \theta) \quad \csc \theta = \sec\left(\frac{\pi}{2} - \theta\right)$$

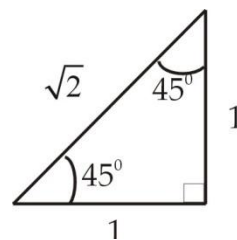
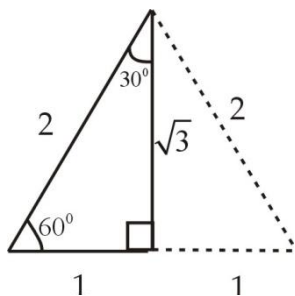
$$\sec \theta = \csc(90^\circ - \theta) \quad \sec \theta = \csc\left(\frac{\pi}{2} - \theta\right)$$

## SPECIAL ANGLES AND THEIR TRIANGLES

$$30^\circ = \frac{\pi}{6}$$

$$45^\circ = \frac{\pi}{4}$$

$$60^\circ = \frac{\pi}{3}$$



## TRIG FUNCTIONS OF SPECIAL ANGLES – MUST BE MEMORIZED!!!

$$\sin \frac{\pi}{3} = \sin 60^\circ = \frac{\sqrt{3}}{2}$$

$$\sin \frac{\pi}{6} = \sin 30^\circ = \frac{1}{2}$$

$$\sin \frac{\pi}{4} = \sin 45^\circ = \frac{\sqrt{2}}{2}$$

$$\cos \frac{\pi}{3} = \cos 60^\circ = \frac{1}{2}$$

$$\cos \frac{\pi}{6} = \cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$\cos \frac{\pi}{4} = \cos 45^\circ = \frac{\sqrt{2}}{2}$$

$$\tan \frac{\pi}{3} = \tan 60^\circ = \sqrt{3}$$

$$\tan \frac{\pi}{6} = \tan 30^\circ = \frac{\sqrt{3}}{3}$$

$$\tan \frac{\pi}{4} = \tan 45^\circ = 1$$

Quadrantal Angles:

	$0^\circ=0$	$90^\circ=\frac{\pi}{2}$	$180^\circ=\pi$	$270^\circ=\frac{3\pi}{2}$
<b>sin</b>	0	1	0	-1
<b>cos</b>	1	0	-1	0
<b>tan</b>	0	undefined	0	undefined
<b>csc</b>	undefined	1	undefined	-1
<b>sec</b>	1	undefined	-1	undefined
<b>cot</b>	undefined	0	undefined	0

Quadrants and signs of the trigonometric functions:

	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>
<b>sin</b>	+	+	-	-
<b>cos</b>	+	-	-	+
<b>tan</b>	+	-	+	-
<b>csc</b>	+	+	-	-
<b>sec</b>	+	-	-	+
<b>cot</b>	+	-	+	-