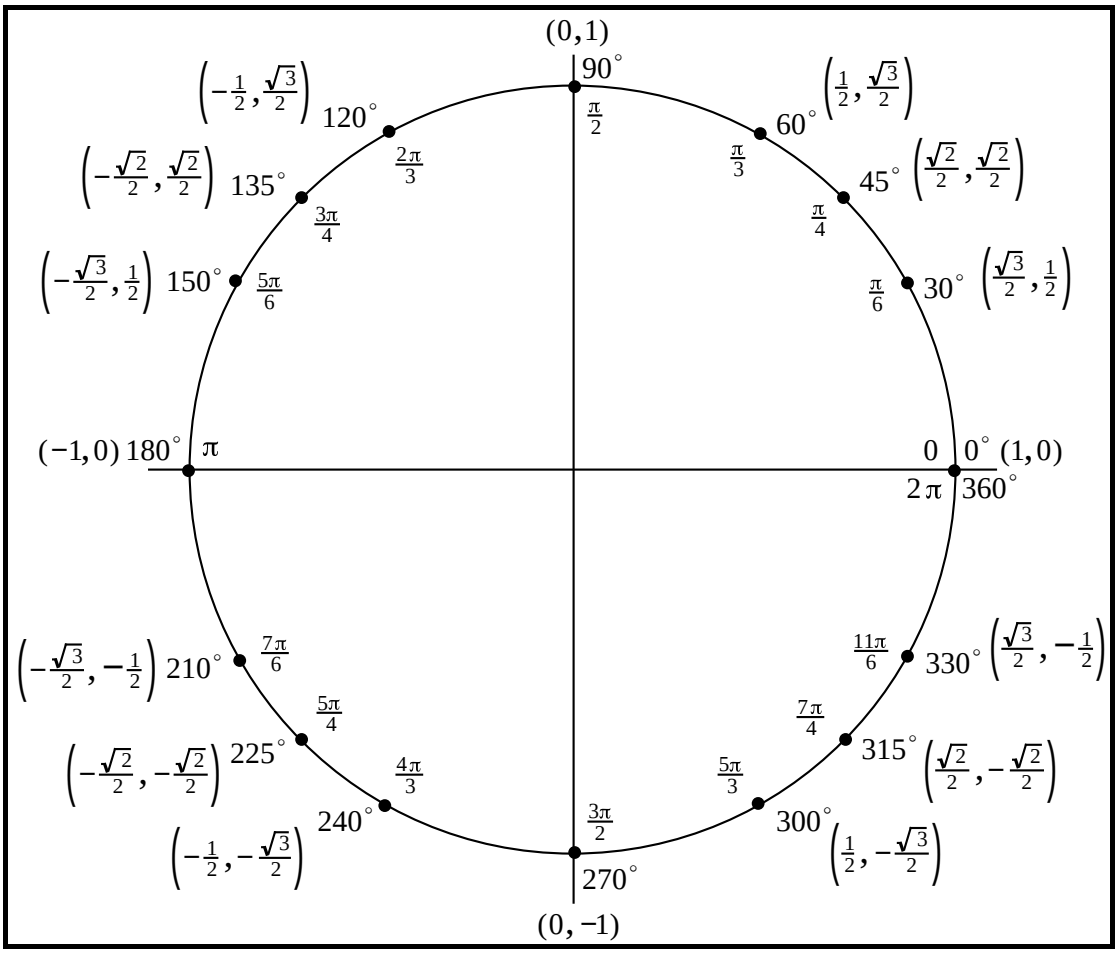
Trigonometry Reference Sheet

The Unit Circle



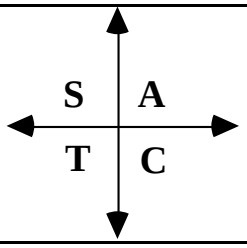
$$(x, y) = (\cos\theta, \sin\theta)$$

To convert degrees to radians, multiply the number of degrees by $\frac{\pi}{180^\circ}$.

To convert radians to degrees, multiply the number of radians by $\frac{180^\circ}{\pi}$.

x degrees	***x*** radians	**sin *x***	**cos *x***	**tan *x***
0°	0	0	1	0
30°	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
45°	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60°	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
90°	$\frac{\pi}{2}$	1	0	undefined

Signs of Trigonometric Functions



"All Students Take Calculus"

Quadrant I	$\sin\theta$, $\cos\theta$, $\tan\theta$ are positive
Quadrant II	$\sin\theta$ is positive; $\cos\theta$, $\tan\theta$ are negative
Quadrant III	$\tan\theta$ is positive; $\sin\theta$, $\cos\theta$ are negative
Quadrant IV	$\cos\theta$ is positive; $\sin\theta$, $\tan\theta$ are negative

Trigonometric Identities

Reciprocal Identities: $\cot\theta = \frac{1}{\tan\theta}$ $\sec\theta = \frac{1}{\cos\theta}$ $\csc\theta = \frac{1}{\sin\theta}$

Ratio Identities: $\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\cot\theta = \frac{\cos\theta}{\sin\theta}$

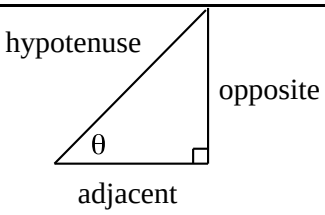
Pythagorean Identities:

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

Negatives:

$$\cos(-\theta) = \cos\theta$$
$$\sin(-\theta) = -\sin\theta$$
$$\tan(-\theta) = -\tan\theta$$

Right Triangles



$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$ $\csc\theta = \frac{\text{hypotenuse}}{\text{opposite}}$

$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}}$ $\sec\theta = \frac{\text{hypotenuse}}{\text{adjacent}}$

$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$ $\cot\theta = \frac{\text{adjacent}}{\text{opposite}}$

Special Right Triangles