

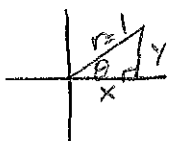
### Quadrantal Angles

angles whose terminal side falls on an axis (not in a quadrant)

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

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

	Work	Reciprocal
-1	$-\frac{1}{\frac{1}{-1}} = \frac{-1}{1} = -1$	-1
1	$\frac{1}{1}$	1
0	$\frac{0}{1}$	$\frac{1}{0} = \emptyset = \text{undef.}$
$\emptyset$	$\frac{1}{0}$	$\frac{0}{1} = 0$



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

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

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

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

reciprocals

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

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

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

Tan/sec  
undefined

$\frac{\pi}{2}$

$S = 1 \quad \csc = 1$

$C = 0 \quad \sec = \frac{1}{0} = \emptyset$

$T = \frac{1}{0} = \emptyset \quad \cot = \frac{0}{1} = 0$

$90^\circ$

$(0, 1)$

$\csc + \cot$   
undefined

$S = 0 \quad \csc = \emptyset$

$C = -1 \quad \sec = -1$

$T = 0 \quad \cot = \emptyset$

$\pi$

$180^\circ$

$(-1, 0)$

radius = 1

$0^\circ$

$(1, 0)$

$360^\circ \quad 2\pi$

$\csc / \cot$   
undefined

$S = 0 \quad \csc = \emptyset$

$C = 1 \quad \sec = 1$

$T = 0 \quad \cot = \emptyset$

$(0, -1)$

$270^\circ$

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

$S = -1 \quad \csc = -1$

$C = 0 \quad \sec = \emptyset$

$T = \emptyset \quad \cot = 0$

sec/Tan  
undefined

What is  $\cos 0^\circ$ ? 1

What is  $\csc 180^\circ$ ?  $\emptyset$

What is  $\sec -180^\circ$ ? -1

What is  $\cot \frac{\pi}{2}$ ? 0

What is  $\cos -90^\circ$ ? 0

What is  $\sec \frac{3\pi}{2}$ ?  $\emptyset$

What is undefined at  $90^\circ$ ?

$\tan + \sec$

What is undefined at  $180^\circ$ ?

$\csc + \cot$

What is undefined at  $270^\circ$ ?

$\tan + \sec$

What is undefined at  $360^\circ$ ?

$\csc + \cot$