

# TRIGONOMETRIC GRAPHS: COSECANT AND SECANT

$$y = A \csc B(x-h) + k$$

$$y = A \sec B(x-h) + k$$

A = amplitude

B = effects the period

$$\text{Period} = \frac{2\pi}{B}$$

$x = h$  : phase shift (horizontal shift)

$y = k$  : center line (vertical shift)

Note: graph the reciprocal function (sine or cosine) first, then restrict the domain and range.

## $y = \csc x$

Reciprocal  $\rightarrow y = \sin x$

$$A = 1$$

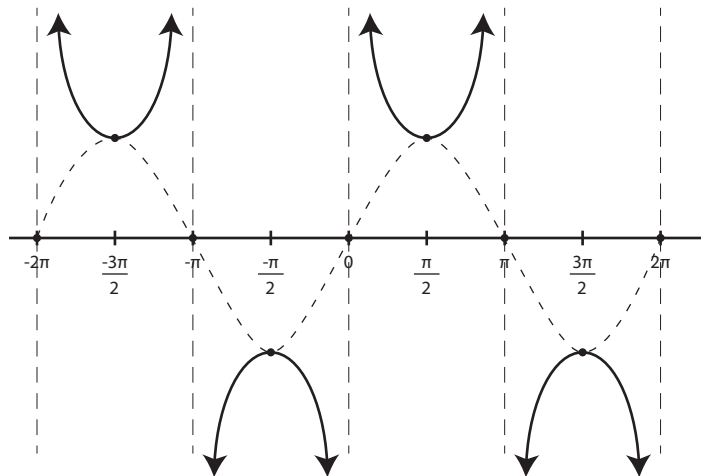
$$B = 1$$

$$\text{Period} = 2\pi$$

$$x = 0$$

$$y = 0$$

1. graph  $y = \sin x$
2. place vertical asymptotes wherever  $y = \sin x$  crosses the center line
3. make "U s" and "∩ s"



## $y = \sec x$

Reciprocal  $\rightarrow y = \cos x$

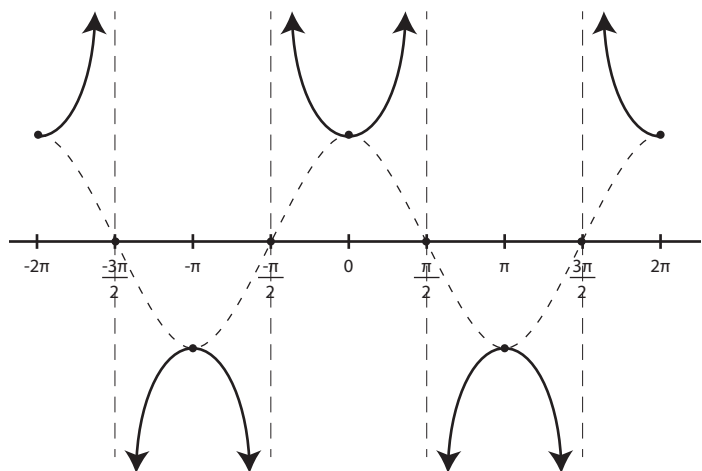
$$A = 1$$

$$B = 1$$

$$\text{Period} = 2\pi$$

$$x = 0$$

$$y = 0$$



$$y = 2 \csc \left( x - \frac{\pi}{2} \right)$$

Reciprocal  $\rightarrow y = \sin \left( x - \frac{\pi}{2} \right)$

A = 2

B = 1

Period =  $2\pi$

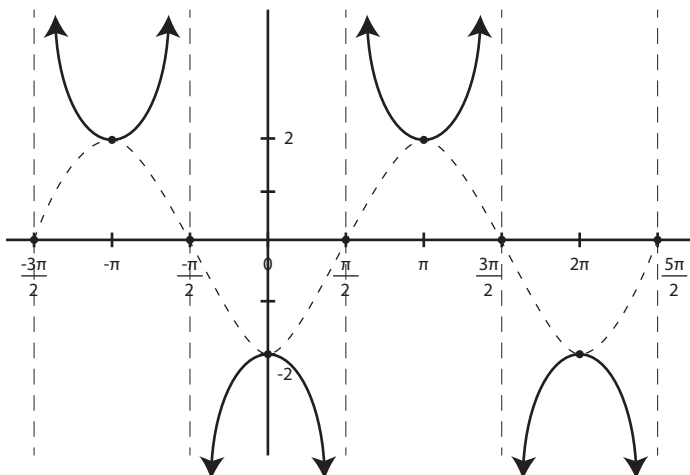
$x = \pi/2$

$y = 0$

Graphing Window:

$$-2\pi \leq \left( x - \frac{\pi}{2} \right) \leq 2\pi$$

$$-\frac{3\pi}{2} \leq x \leq \frac{5\pi}{2}$$



$$y = 1 - 3 \sec 4 \left( x - \frac{\pi}{4} \right)$$

Reciprocal  $\rightarrow y = -3 \cos 4 \left( x + \frac{\pi}{4} \right) + 1$

A = 3

B = 4

Period =  $\frac{2\pi}{4} = \frac{\pi}{2}$

$x = \pi/4$

$y = 1$

Graphing Window:

$$-\frac{\pi}{2} \leq \left( x + \frac{\pi}{4} \right) \leq \frac{\pi}{2}$$

$$-\frac{3\pi}{4} \leq x \leq \frac{\pi}{4}$$

