

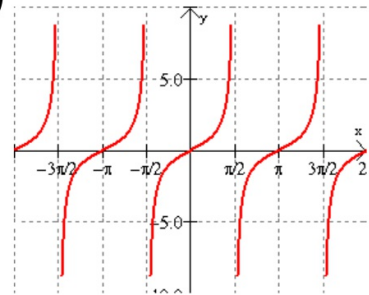
p. 304 4.6 Graphs of other Trigonometric Functions

Tangent Function

* undefined when $x = 0$ (asymptotes)

** Asymptotes: $bx - c = -\pi/2$ and $bx - c = \pi/2$

period: $\frac{\pi}{b}$



Steps for Graphing:

- 1.) Plot the asymptotes and x-intercepts.
- 2.) Plot a few additional points between asymptotes, sketch the cycle. "a" for additional points
- 3.) Sketch one or two additional cycles.

Students will be able to graph the tangent function.

Example 1: Sketch the graph (include two full periods)

a.) $y = \tan 3x$

period: $\frac{\pi}{3}$

$$\frac{3x}{3} = -\frac{\pi}{2}$$

$$x = -\frac{\pi}{6}$$

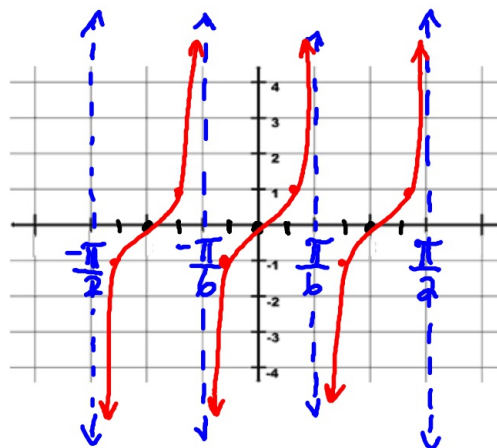
$$\frac{3x}{3} = \frac{\pi}{2}$$

$$x = \frac{\pi}{6}$$

additional asymptotes:

asym + period

$$\frac{\pi}{6} + \frac{2\pi}{3} = \frac{3\pi}{6} = \frac{\pi}{2}$$



Students will be able to graph the tangent function.

b.) $y = -4 \tan \frac{x}{3}$

period: $\frac{\pi}{\frac{1}{3}} = 3\pi$

~~1.~~ $\frac{x}{3} = -\frac{\pi}{2}$

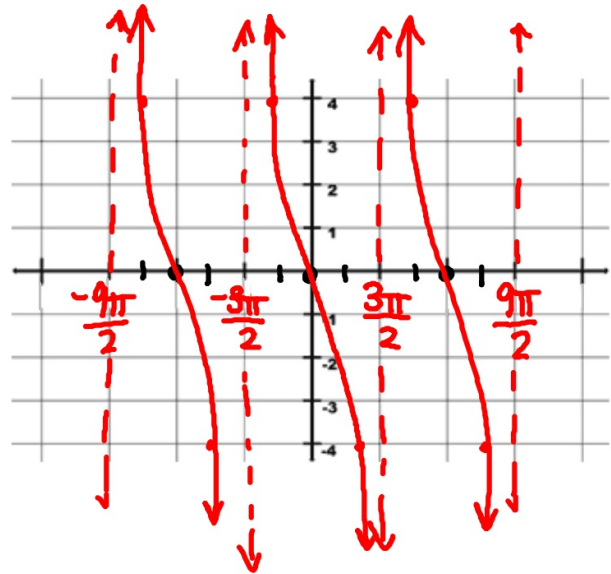
3. $\frac{x}{3} = \frac{\pi}{2}$

$x = -\frac{3\pi}{2}$

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

Additional

$\frac{3\pi}{2} + 3\pi = \frac{9\pi}{2}$



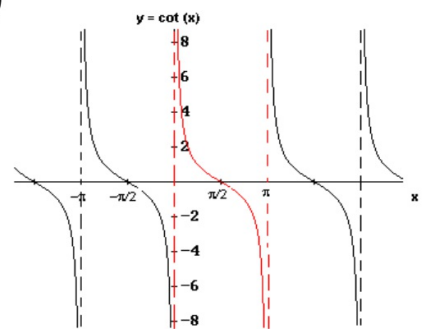
Cotangent Function

* undefined when $y = 0$ (asymptotes)

** Asymptotes:

$bx - c = 0$ and $bx - c = \pi$

period: $\frac{\pi}{b}$



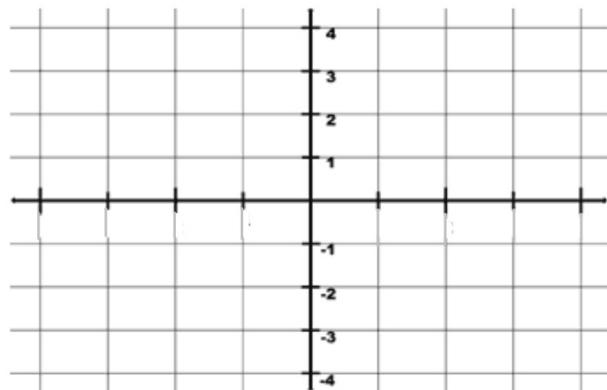
Steps for Graphing:

- 1.) Plot the asymptotes and x-intercepts.
- 2.) Plot a few additional points between asymptotes, sketch the cycle.
- 3.) Sketch one or two additional cycles.

Students will be able to graph the cotangent function.

Example 2: Sketch the graph (include two full periods)

a.) $y = 3\cot\pi x$



Students will be able to graph the cotangent function.

b.) $y = \frac{1}{4}\cot(x + \pi)$

period: $\frac{\pi}{1} = \pi$

$$\frac{x + \pi = 0}{-\pi \quad -\pi}$$

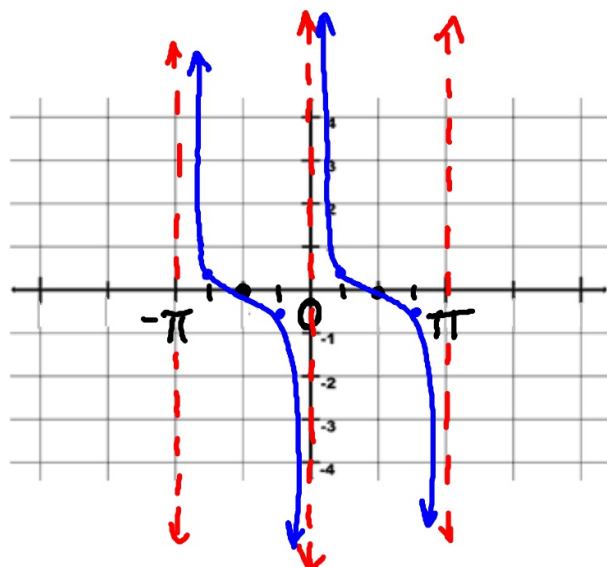
$$x = -\pi$$

$$\frac{x + \pi = \pi}{-\pi \quad -\pi}$$

$$x = 0$$

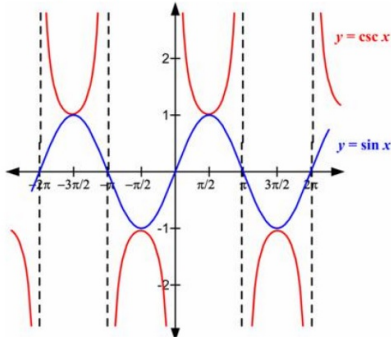
Additional Asym:

$$0 + \pi = \pi$$



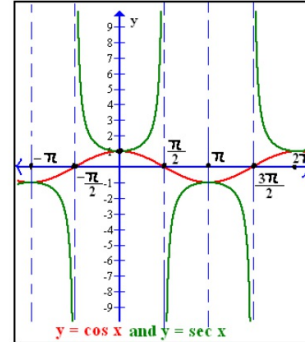
Cosecant Function

- * undefined $y=0$
(asymptote)



Secant Function

- * undefined $x=0$
(asymptote)



Steps for Graphings:

- 1.) Sketch the reciprocal function (sine or cosine)
- 2.) Take the reciprocal of the x or y values.

**Hint: The x-intercepts become the asymptotes

Students will be able to graph the cosecant and secant function.

Example 3: Sketch the graph (include two full periods)

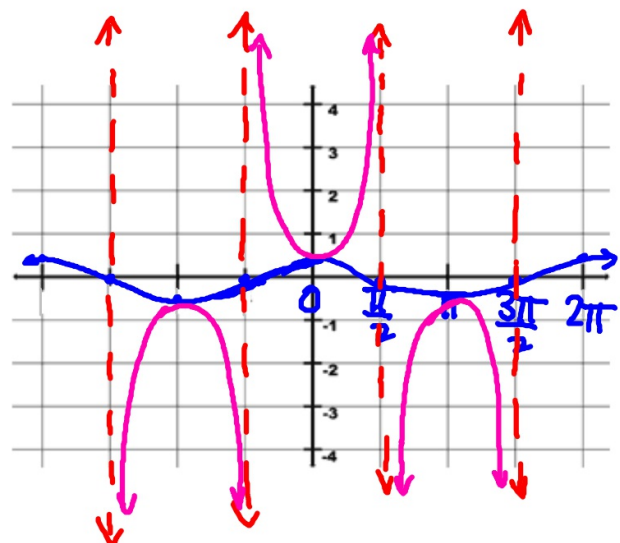
a.) $y = \frac{1}{4} \sec x$

① Graph $y = \frac{1}{4} \cos x$

amp: $\frac{1}{4}$ period: 2π

x	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
1	0	-1	0	1	
$\frac{1}{4}$	0	$\frac{1}{4}$	0	$\frac{1}{4}$	$\frac{1}{4}$

asymptote



Students will be able to graph the cosecant and secant function.

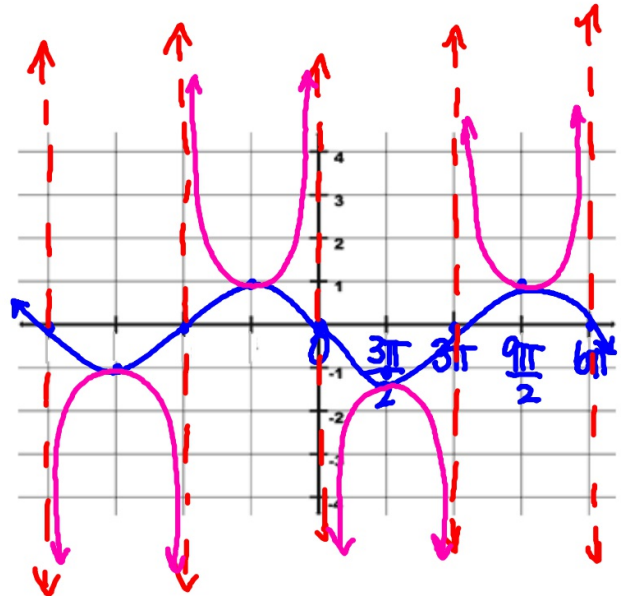
b.) $y = -\csc\frac{x}{3}$

① Graph $y = -\sin\frac{x}{3}$

amp: $|-1|=1$ period: $\frac{2\pi}{\frac{1}{3}} = 6\pi$

incrim: $\frac{6\pi}{4} = \frac{3\pi}{2}$

X	0	$\frac{3\pi}{2}$	3π	$\frac{9\pi}{2}$	6π
	<u>0</u>	1	<u>0</u>	-1	<u>0</u>
	0	-1	0	1	0



Students will be able to graph the cosecant and secant function.

c.) $y = 2\sec 4x + 2$

