

Graphs of Secant, Cosecant, and Cotangent Functions
(No Shifts)
Module 3, Unit 7, Lesson 9

Graphs of Cosecant, Secant, and Cotangent

We obtain the graphs of the cosecant, secant, and cotangent curves by using the reciprocal identities

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

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

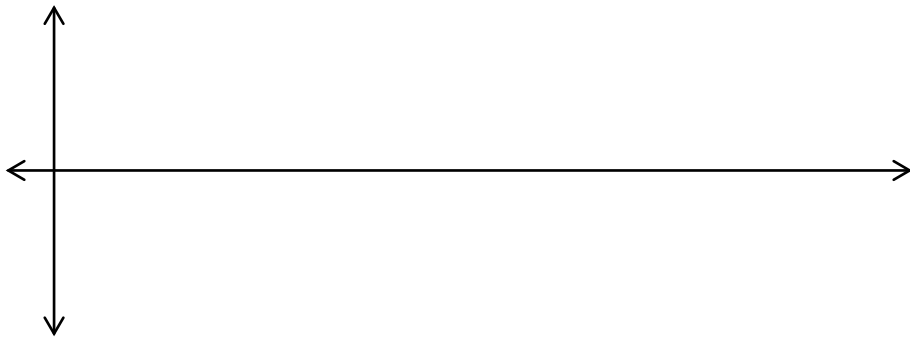
$$\cot x = \frac{1}{\tan x}$$

Steps to Graphing Cosecant and Secant

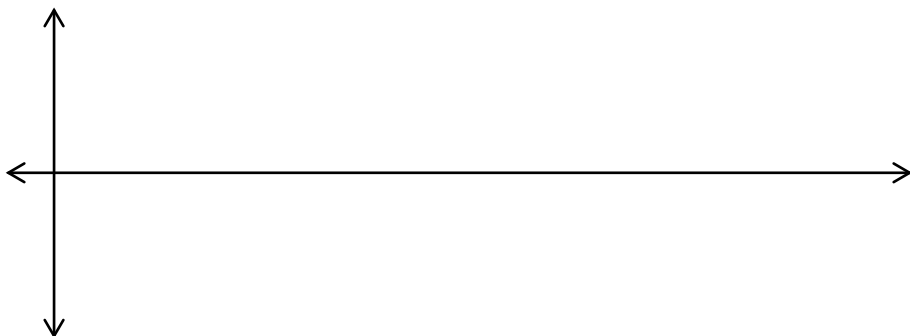
1. Graph the sine or cosine function.
 - a. Dash the function.
2. Since cosecant and secant are reciprocal identities:
 - a. Intercepts become asymptotes.
 - b. Maximums become minimums.
 - c. Minimums become maximums.

Example 1: Graph two full periods of the function.

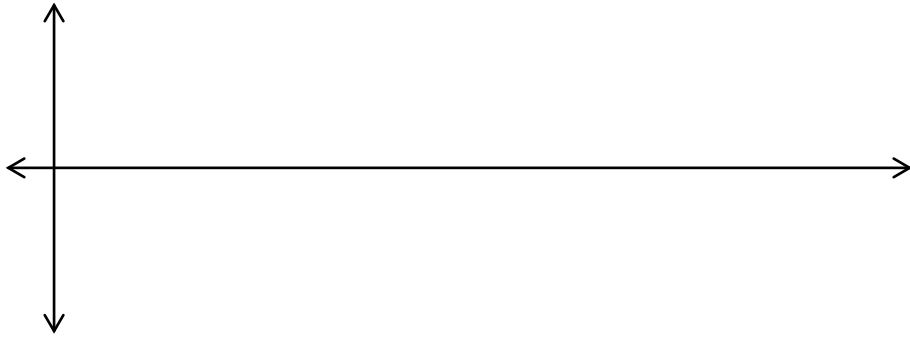
a. $y = -3\sec\frac{x}{2}$



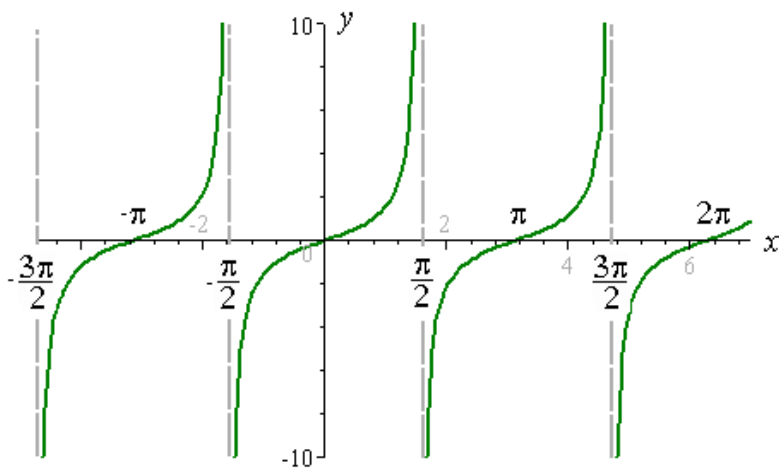
b. $f(x) = \frac{-3}{2}\csc\pi x$



c. $f(x) = 2 \csc \frac{\pi}{3} x$



d. $f(x) = -\sec \frac{3}{2} x$



Graphing Cotangent Functions $y = A \cot(Bx)$

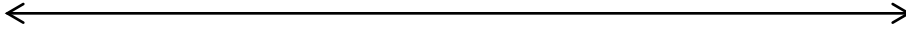
1. A pair of consecutive asymptotes can be found by solving for x .

$$Bx = 0 \text{ and } Bx = \pi$$

2. Identify an x -intercept, midway between the consecutive asymptotes.
3. Find the points on the graph $\frac{1}{4}$ and $\frac{3}{4}$ of the way between consecutive asymptotes. These points have y -coordinates A and $-A$, respectively.

Example 2: Graph two full periods of the cotangent function.

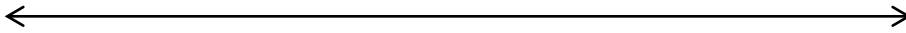
a. $f(x) = 3 \cot 2x$



b. $f(x) = \frac{1}{2} \cot \frac{x}{2}$



c. $f(x) = -\cot 2\pi x$



d. $f(x) = -3 \cot \frac{\pi}{2} x$

