What is the Domain and Range of Sinx and Cosx?

Sinx:

Domain:

All Real #'s

Range:

$-1 \le y \le 1$

Cosx:

Domain:

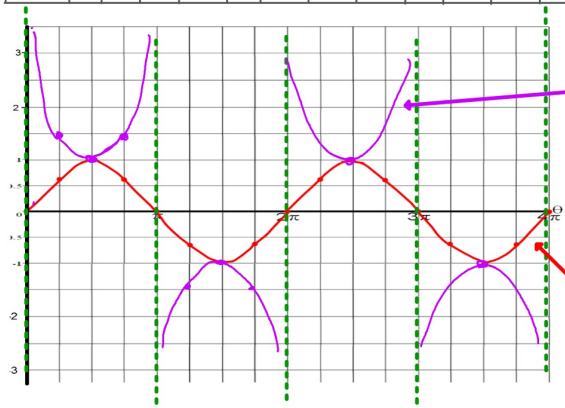
All Real #'s

Range:

$-1 \le y \le 1$

θ	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π	$\frac{5\pi}{4}$	$\frac{3\pi}{2}$	$\frac{7\pi}{4}$	2π	$\frac{9\pi}{4}$	$\frac{5\pi}{2}$	$\frac{11\pi}{4}$	3π	$\frac{13\pi}{4}$	$\frac{7\pi}{2}$	$\frac{15\pi}{4}$	4π
Sinθ	0	.71	1	.71	0	-.71	-1	-.71	0	.71	1	.71	0	-.71	-1	-.71	0
Cscθ	undef	1.41	1	1.41	undef	-1.41	-1	-1.41	undef	1.41	1	1.41	undef	-1.41	-1	-1.41	undef

these values for Cscθ are found by taking the reciprocal of the Sinθ values.



On your calculator use the following window:

x:[0,4π] y:[-3,3]

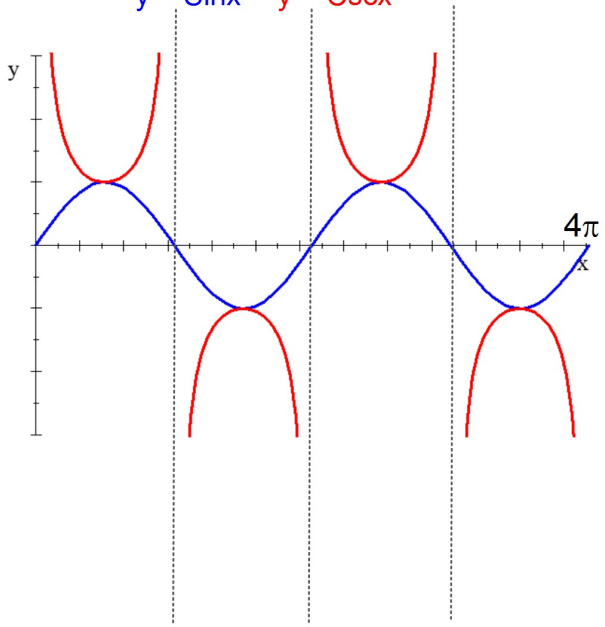
Graph these functions:

Y_1 = Sinx

Y_2 = Cscx

Graphs of the Inverse Trig Functions: y = Cscx

y = Sinx y = Cscx



VA:

Where Sinx=0

Where Sinx crosses the midline.

Local Max:

Where Sinx is a MIN

Local Min:

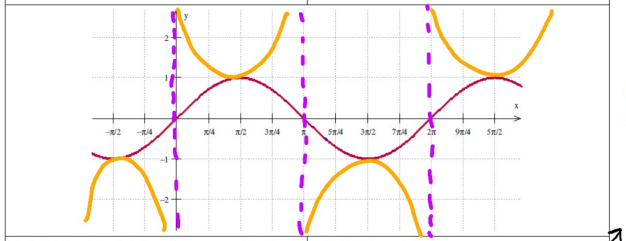
Where Sinx is a MAX

Period of Cscx: 2π

A Cosecant Function
The cosecant function is the reciprocal of the sine function:

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

Ex 1. In the following figure is represented graphically the sine function. Graph the cosecant function $\csc(x) = \frac{1}{\sin(x)}$ on the same grid.



Ex 2. List the characteristics of the cosecant function.

Domain All Real #'s except when Sinx=0

Range $y \leq -1,\ y \geq 1$

$(-\infty,-1] \cup [1,\infty)$

Vertical Asymptote(s) When Sinx=0

Zero(s) None

Minimum/maximum point(s)

Period 2π

Cscx has NO Absolute Max or Min.

Cscx has a Local Min when Sinx has a Local Max.

Cscx has a Local Max when Sinx has a Local Min.

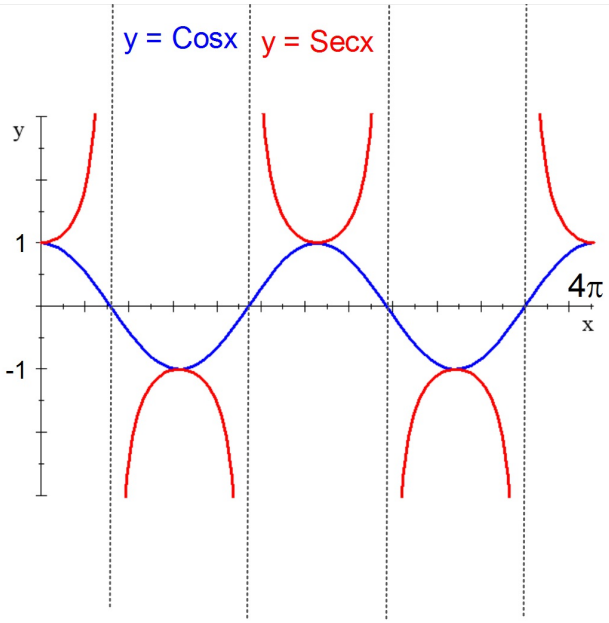
On your calculator use the following window:

x:[0,4π] y:[-3,3]

Graph these functions:

$Y_1 = \text{Cosx}$

$Y_2 = \text{Secx}$



VA:
Where Cosx=0
Where Cosx crosses midline.

Max:
Where Cosx is a MIN

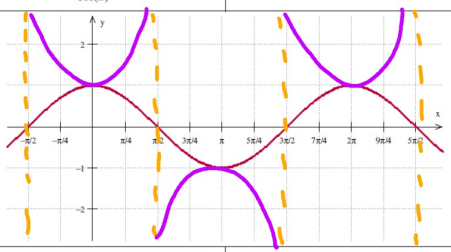
Min:
Where Cosx in a MAX

Period of Secx: 2π

B Secant Function
The secant function is the reciprocal of the cosine function:

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

Ex 3. In the following figure is represented graphically the cosine function. Graph the secant function $\sec(x) = \frac{1}{\cos(x)}$ on the same grid.



Ex 2. List the characteristics of the cosecant function.

Domain All Real #'s except when Cosx=0

Range $y \leq -1,\ y \geq 1$

$(-\infty,-1] \cup [1,\infty)$

Vertical Asymptote(s) When Cosx=0

Zero(s) None

Minimum/maximum point(s)

Period 2π

Secx has NO Absolute Max or Min.

Secx has a Local Min when Cosx has a Local Max.

Secx has a Local Max when Cosx has a Local Min.

Y = aSinbx Y = aCosbx

What is the period of these two functions?

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

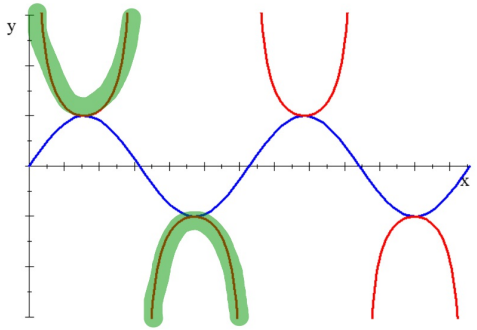
Y = aCscbx Y = aSecbx

What is the period of these two functions?

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

One period of a Csc and Sec function is highlighted below in green.

It's a total of these two parabolic shapes, one that opens up and one that opens down, not just one of them.

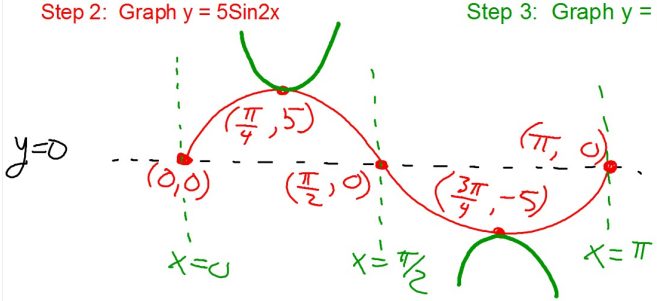


Sketch one period of y = 5Csc(2x). Label the coordinates of the Max, Min, and identify the VA.

Step 1: Start by writing this as a Sin function and finding the following: y=5Sin(2x)

Amplitude = 5 Period = π Midline: $y=0$ Phase Shift: NONE

Step 2: Graph y = 5Sin2x Step 3: Graph y = 5Csc2x



Sketch one period of the function below. Label the coordinates of the Max, Min, and identify the VA.

$y = 7\text{Sec}(x + \frac{2\pi}{3}) - 1$

Cos is graphed in red

Sec is graphed in blue

$\rightarrow$ $y = 7\cos(x + \frac{2\pi}{3}) - 1$

Amp = 7 period = 2π

midline: $y = -1$

phase shift $\frac{2\pi}{3}$ left

$\frac{1}{4}(2\pi) = \frac{\pi}{2}$