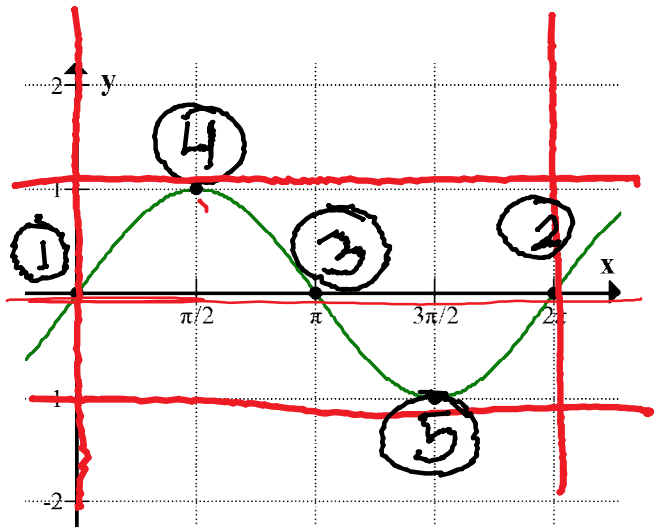
C12 - 5.1 - TOV Radians sinx,cosx,tanx TOV Graphs Notes

$y = \sin x$

Table of Values

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

Pt.
(0,0)
$(\frac{\pi}{2},1)$
$(\pi,0)$
$(\frac{3\pi}{2},-1)$
$(2\pi,0)$



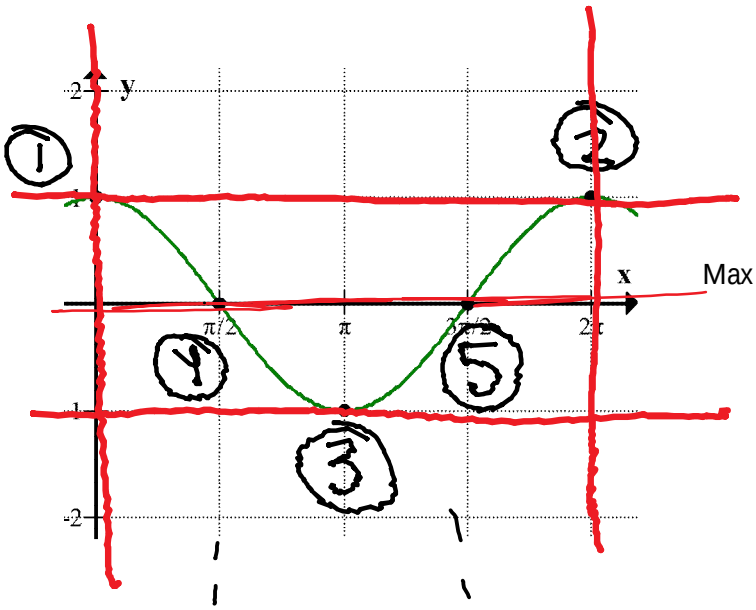
Center Line Up

$y = \cos x$

Table of Values

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

Pt.
(0,1)
$(\frac{\pi}{2},0)$
$(\pi,-1)$
$(\frac{3\pi}{2},0)$
$(2\pi,1)$



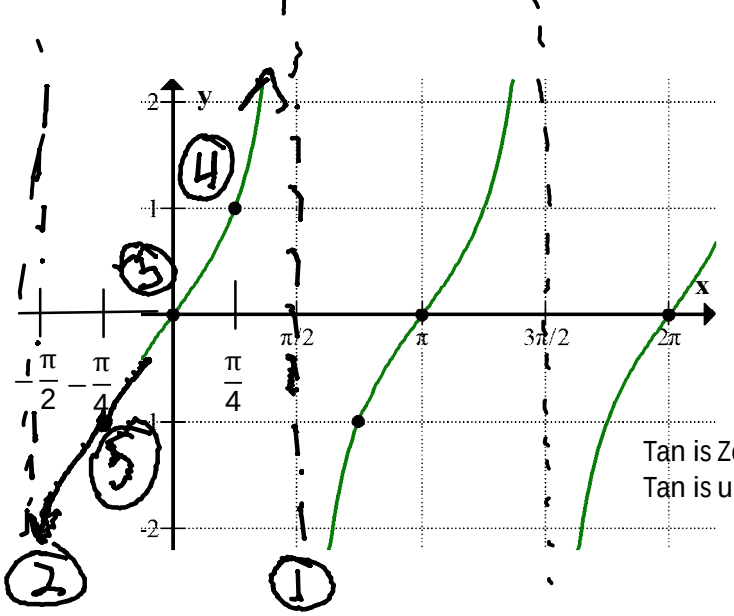
Max Line Down

$y = \tan x$

Table of Values

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

Pt.
(0,0)
$(\frac{\pi}{4},1)$
$(\frac{\pi}{2},\text{und})$
$(\frac{3\pi}{4},-1)$
$(\pi,0)$



$tanx = \frac{sinx}{cosx}$

Tan is Zero when sin is zero
Tan is und when cos is zero

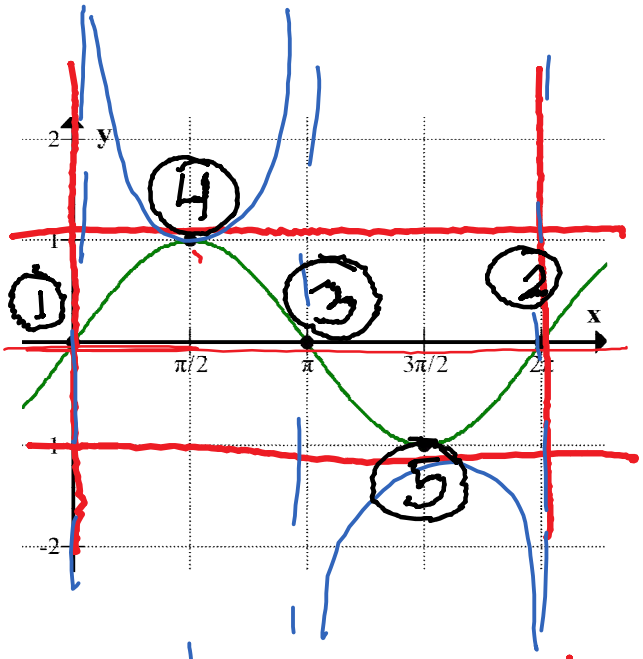
C12 - 5.1 - TOV Radians cscx,secx,cotx TOV Graphs Notes

$y = \csc x$

Table of Values

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

Pt.
(0,0)
$(\frac{\pi}{2},1)$
$(\pi,0)$
$(\frac{3\pi}{2},-1)$
$(2\pi,0)$

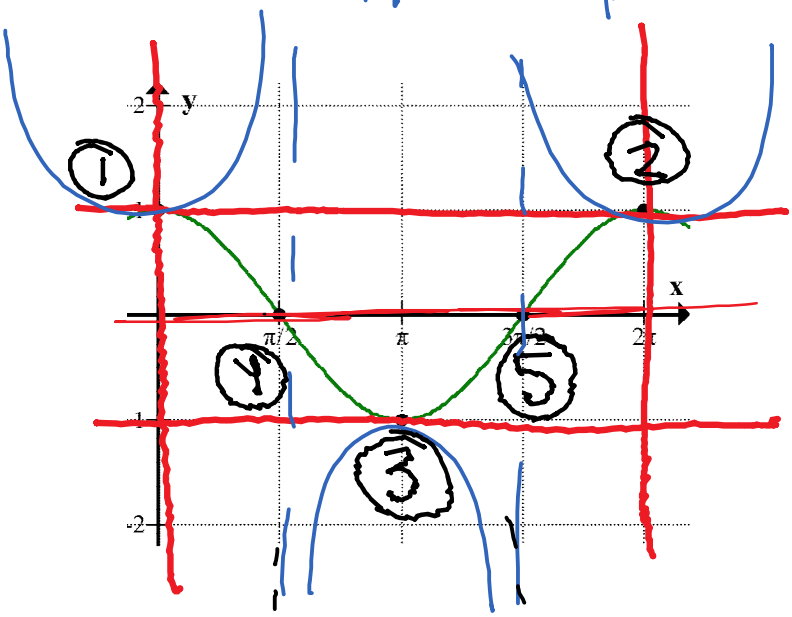


$y = \sec x$

Table of Values

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

Pt.
(0,1)
$(\frac{\pi}{2},0)$
$(\pi,-1)$
$(\frac{3\pi}{2},0)$
$(2\pi,1)$

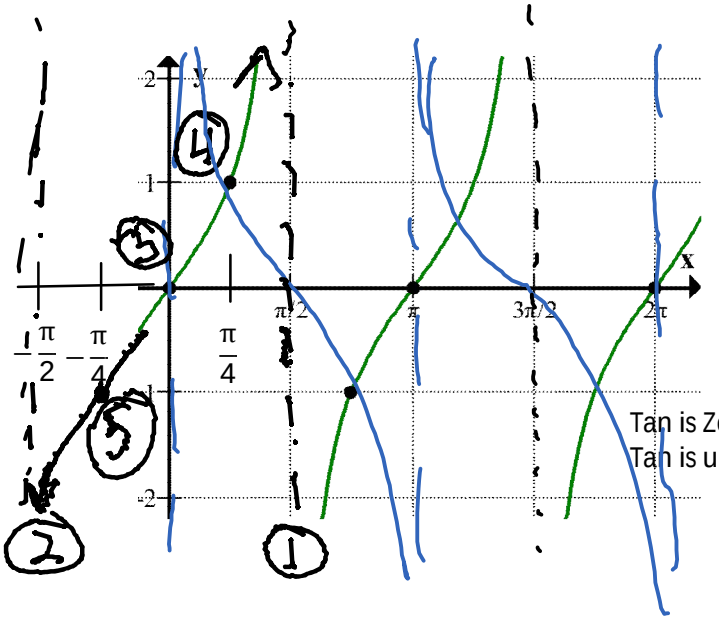


$y = \cot x$

Table of Values

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

Pt.
(0,0)
$(\frac{\pi}{4},1)$
$(\frac{\pi}{2},\text{und})$
$(\frac{3\pi}{4},-1)$
$(\pi,0)$



$tanx = \frac{sinx}{cosx}$

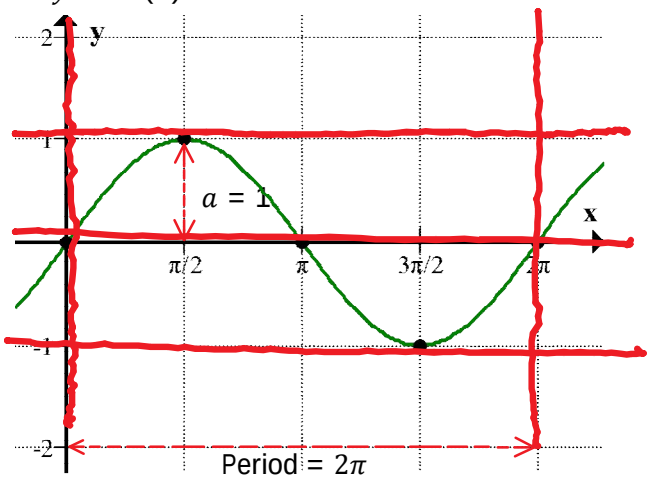
Tan is Zero when sin is zero
Tan is und when cos is zero

C12 - 5.2 - (a,b) Sine Transformations Notes

$$y = a\sin(b(x - c)) + d$$

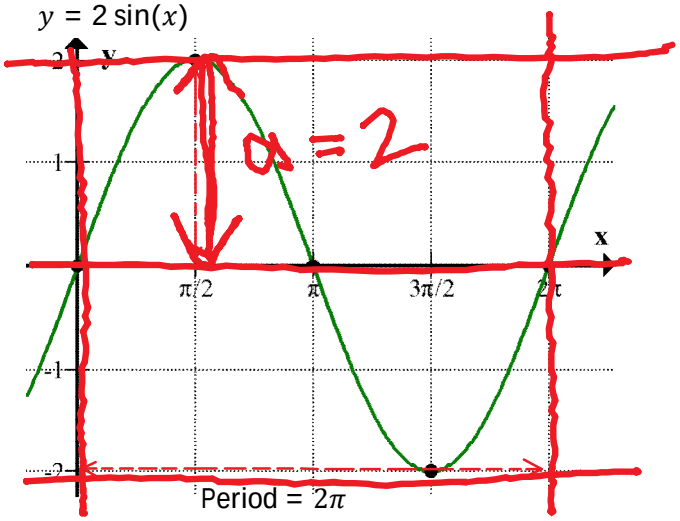
Amplitude | Period = $\frac{2\pi}{b}$ | Phase Shift | Center Line

$y = \sin(x)$



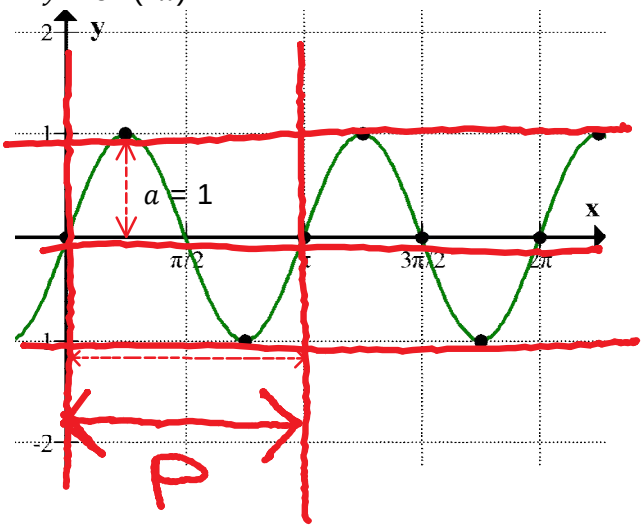
Amplitude Change

$y = 2\sin(x)$



Period Change

$y = \sin(2x)$



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

$$p = \frac{2\pi}{2}$$

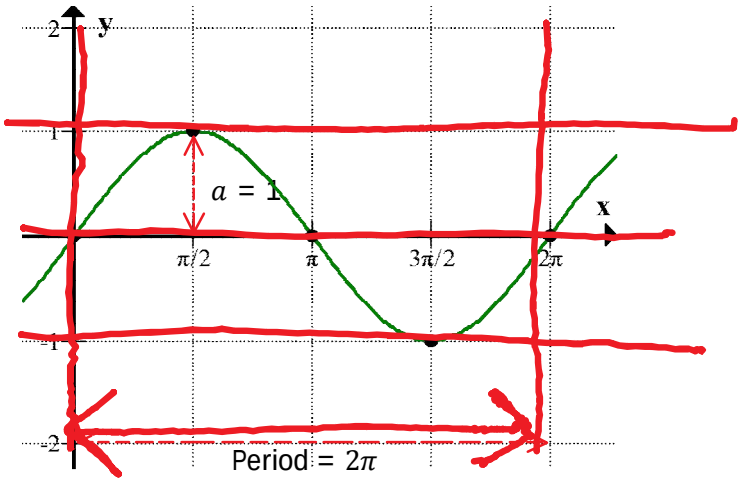
$$p = \pi$$

C12 - 5.3 - (d,c) Sinusoidal Transformations Notes

$$y = a\sin(b(x - c)) + d$$

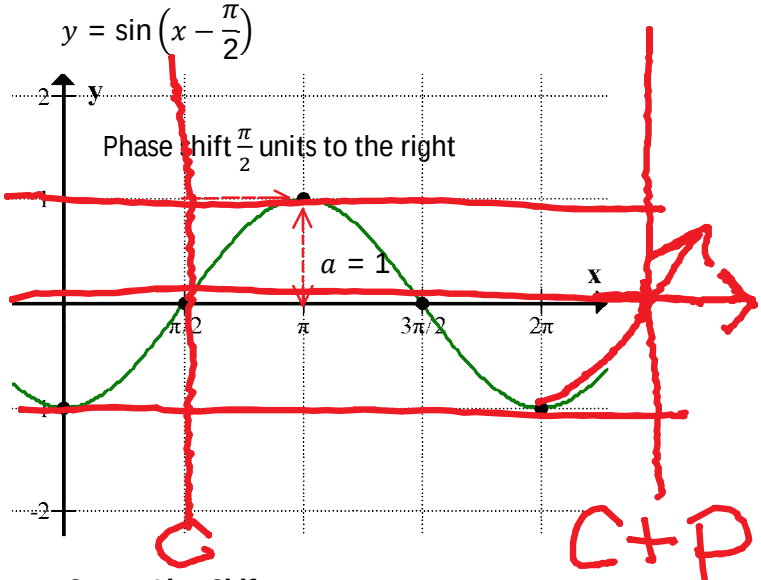
Amplitude | Period = $\frac{2\pi}{b}$ | Phase Shift | Center Line

$y = \sin(x)$



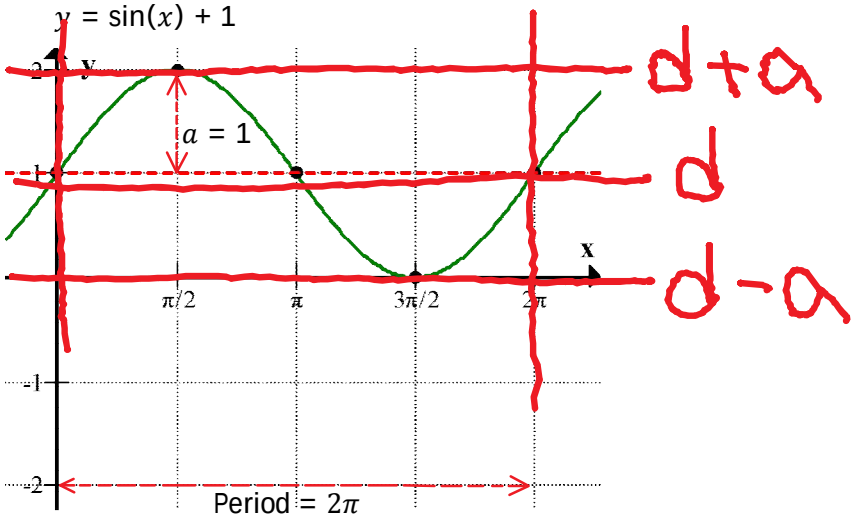
Phase Shift

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



Center Line Shift

$y = \sin(x) + 1$

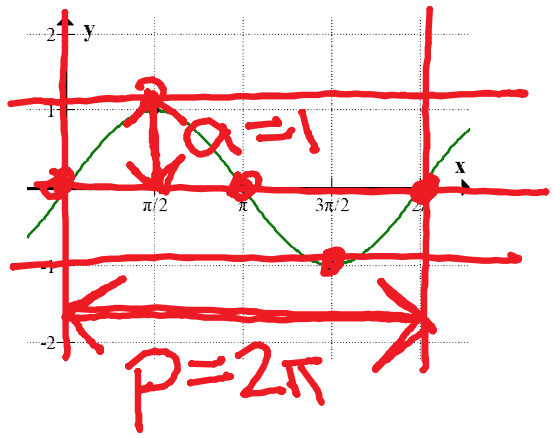


C12 - 5.3 - Graphing Sin Equations Notes

$$y = a\sin(b(x - c)) + d$$

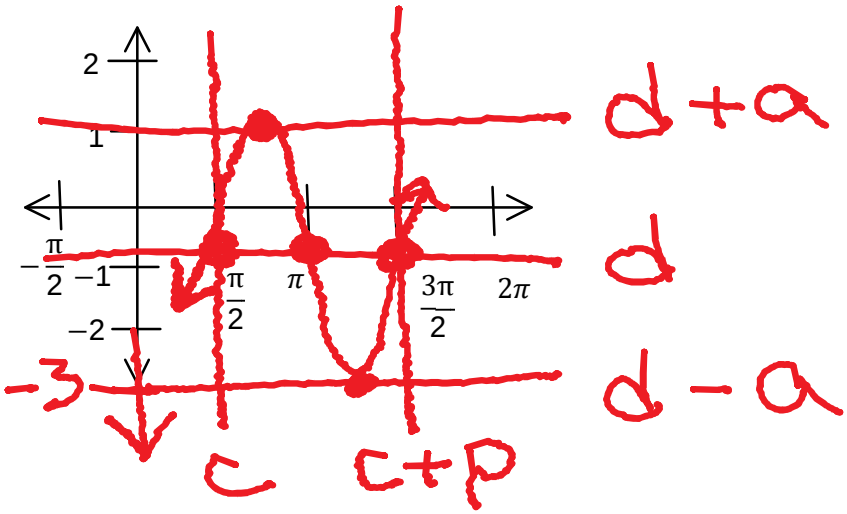
Amplitude | Period = $\frac{2\pi}{b}$ | Phase Shift | Center Line

$y = \sin(x)$



Draw horizontal center line "d"
Draw max and min horizontal center line "$a \pm d$"
Draw phase shift vertical start line "c"
Calculate period "p"
Draw end "$c + p$"
12345

$y = 2\sin(2\left(x - \frac{\pi}{2}\right)) - 1$ $\quad y = a\sin(b(x - c)) + d$ $\quad a = 2$ $\quad d = -1$



$b = 2$ $\quad c = \frac{\pi}{2}$ $(Right\frac{\pi}{2})$

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

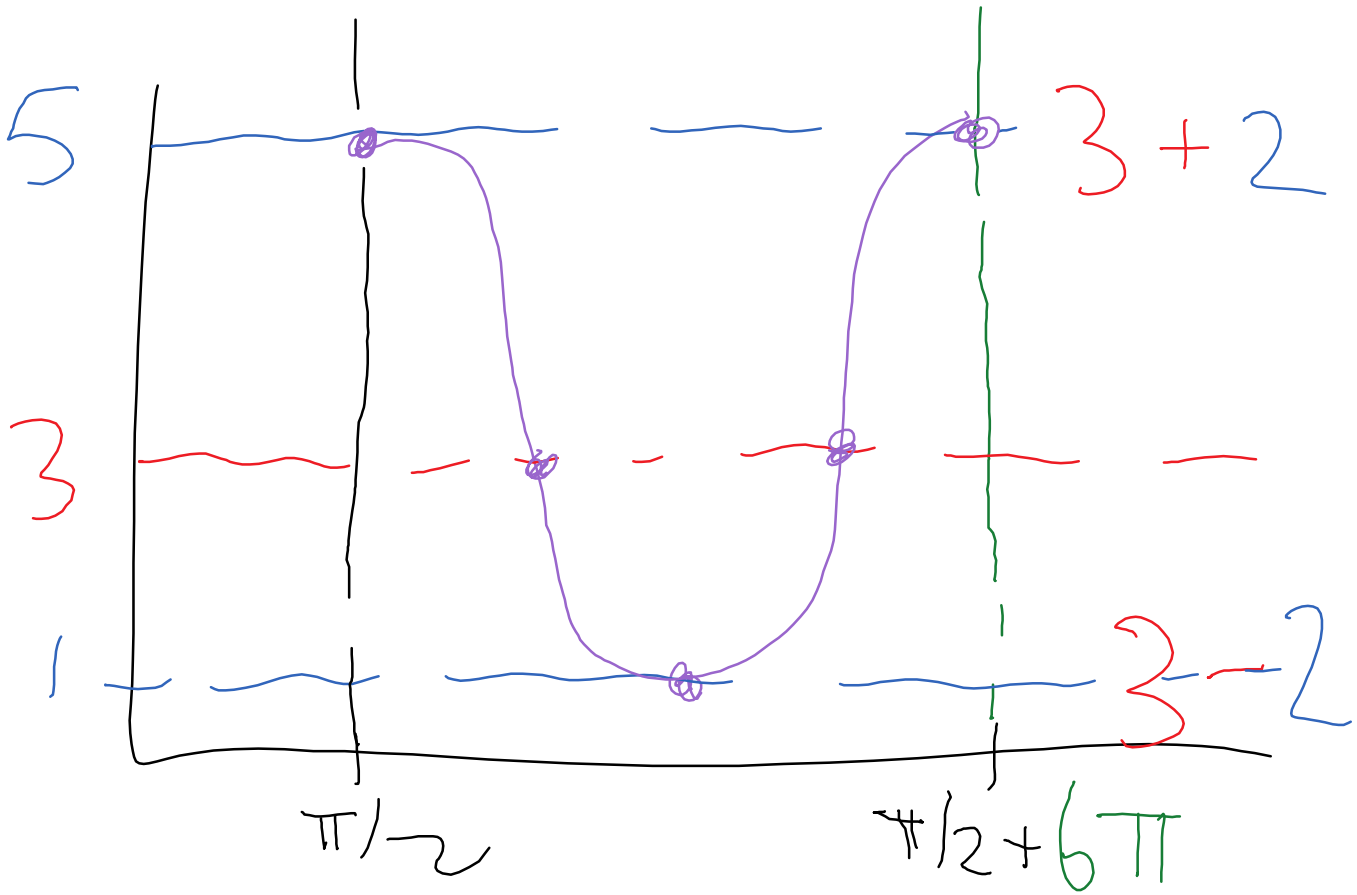
$c + p = \frac{\pi}{2} + \pi = \frac{3\pi}{2}$

Remember: Make x-increments lcm of c and p.

C12 - 5.3 - Graph Steps Review

$$2\cos\frac{2}{3}\left(x-\frac{\pi}{2}\right)+3$$

$$P=\frac{2\pi}{b}=\frac{2\pi}{\frac{2}{3}}\cdot\frac{3}{2}=6\pi$$

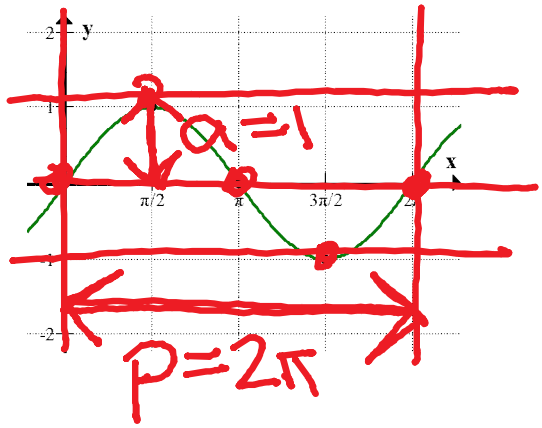


C12 - 5.3 - Find Sin Equation From Graphs Notes

$$y = a\sin(b(x - c)) + d$$

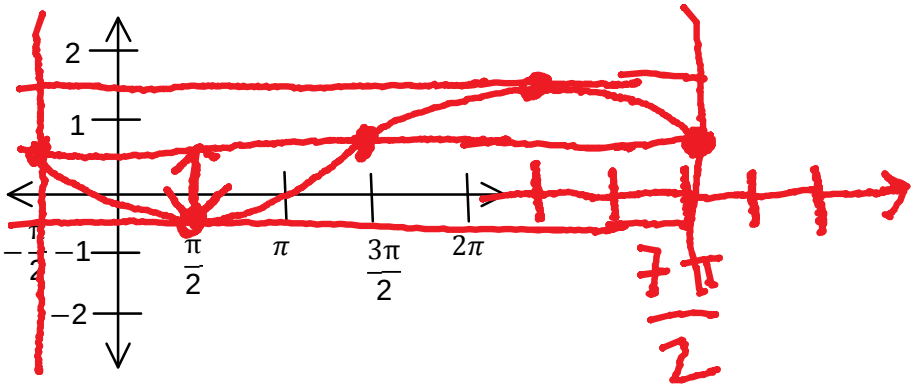
Amplitude | Period = $\frac{2\pi}{b}$ | Phase Shift | Center Line

$y = \sin(x)$



Draw horizontal center line "d"
Draw max and min horizontal center line "$a \pm d$"
Draw phase shift vertical start line "c"
Calculate period "p"
Draw end "$c + p$"
12345

dacb



$a = 1.5 - \frac{1}{2} = 1$

$d = \frac{1}{2}$

$c = -\frac{\pi}{2}$ $(left\ \frac{\pi}{2})$

$p = End - c$
$p = \frac{7\pi}{2} - \left(-\frac{\pi}{2}\right)$
$p = \frac{7\pi}{2} + \frac{\pi}{2}$
$p = \frac{8\pi}{2}$
$p = 4\pi$

$p = \frac{2\pi}{b}$
$b = \frac{2\pi}{p}$
$b = \frac{2\pi}{4\pi}$
$b = \frac{1}{2}$

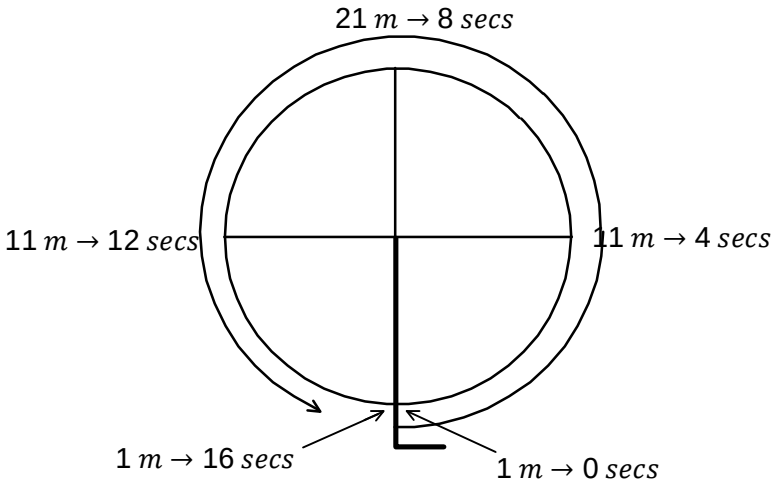
$y = a\sin(b(x - c)) + d$

$y = -1\sin\left(\frac{1}{2}\left(x + \frac{\pi}{2}\right)\right) + \frac{1}{2}$

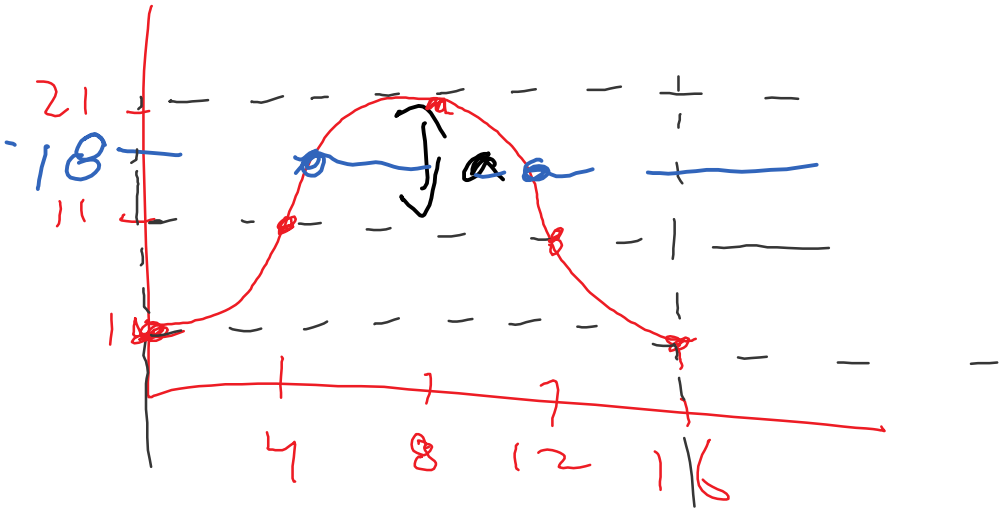
Negative because it opens downward

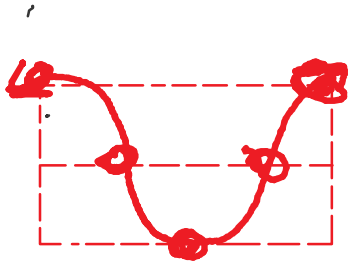
C12 - 5.4 - Ferris Wheel Notes

A Ferris wheel with radius 10 m is 1 m off the ground. It takes 16 seconds for one complete revolution. Draw a diagram of the Ferris wheel, graph the height of a passenger starting at the bottom with a table of values and write the equation. How high at 6 second in. How long above 18m in one cycle.



t	h
0	1
4	11
8	21
12	11
16	1





Starting at the bottom: Make negative

Starting at a max/min: Use cos

The middle is 11: $k = 11$

The difference from the middle to either extreme is 10: $a = 10$

$$p = \frac{2\pi}{b}$$
$$b = \frac{2\pi}{p}$$
$$b = \frac{2\pi}{16}$$
$$b = \frac{\pi}{8}$$

$p = 16\ seconds$

$$y = a\cos(b(x-h)) + k$$
$$h = -10\cos\left(\frac{\pi}{8}(t)\right) + 11$$

$$y = a\sin(b(x-h)) + k$$
$$h = 10\sin\left(\frac{\pi}{8}(t-4)\right) + 11$$

$$h = -10\cos\left(\frac{\pi}{8}(6)\right) + 11$$
$$h = 18.1m$$

$$y_1 = -10\cos\left(\frac{\pi}{8}(t)\right) + 11$$
$$y_2 = 18$$

Find Intersection, and Subtract