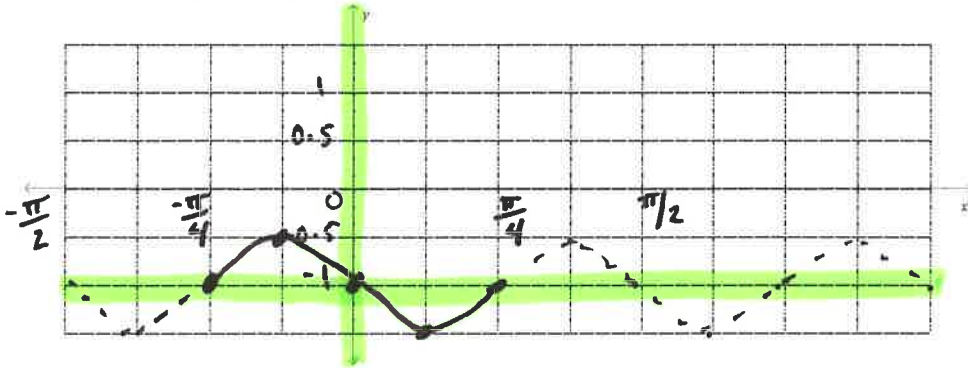


# HPC Trig Graphs & Simple Harmonic Motion Review

1.  $f(x) = 0.5 \sin(4x + \pi) - 1$



Start:  $x = -\frac{\pi}{4}$

$|a| = 0.5$

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

Frequency =  $2/\pi$

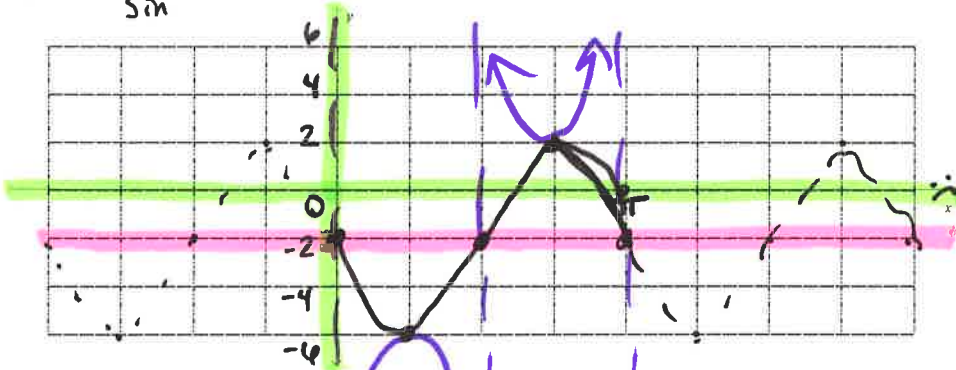
Vertical Shift:

Down 1

Phase shift:

$\frac{\pi}{4}$  left

2.  $f(x) = -4 \csc 2x - 2$   
 $\sin$



Start:  $x = 0$

$|a| = 4$

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

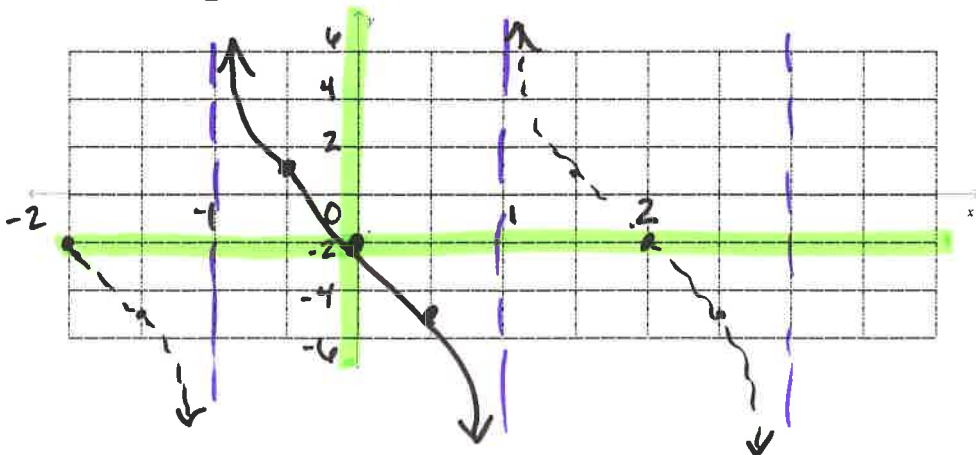
Frequency =  $1/\pi$

Vertical Shift:

Down 2

Phase shift: 0

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



$|a| = 3$

Period =  $\frac{\pi}{\frac{\pi}{2}} = \frac{\pi}{1} \cdot \frac{2}{\pi} = 2$

Frequency =  $1/2$

Vertical Shift:

Down 2

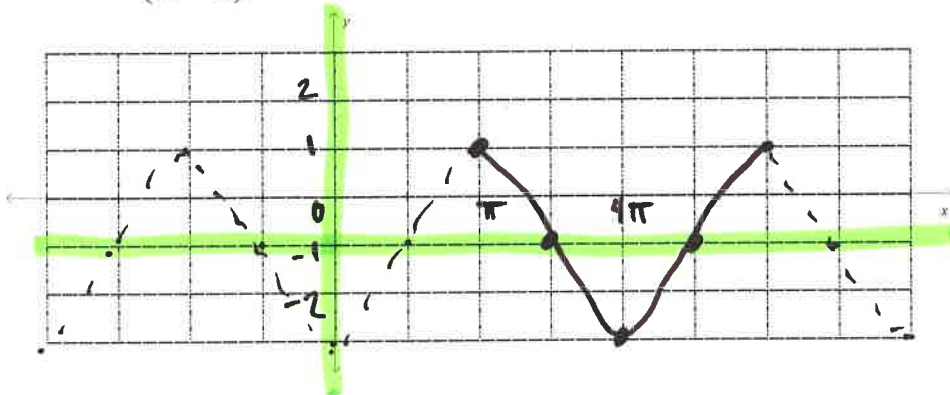
Asymptotes:

$(\frac{2}{\pi}) \frac{\pi}{2} x = \pm \frac{\pi}{2} (\frac{2}{\pi})$

$x = \pm 1$

$Bx + C = \pm \frac{\pi}{2}$

4.  $f(x) = 2 \cos\left(\frac{x}{2} - \frac{\pi}{2}\right) - 1$



Start:  $x = \pi$

$|a| = 2$

Period =  $\frac{2\pi}{\frac{1}{2}} = 4\pi$

Frequency = ~~1/4pi~~  $\frac{1}{4\pi}$

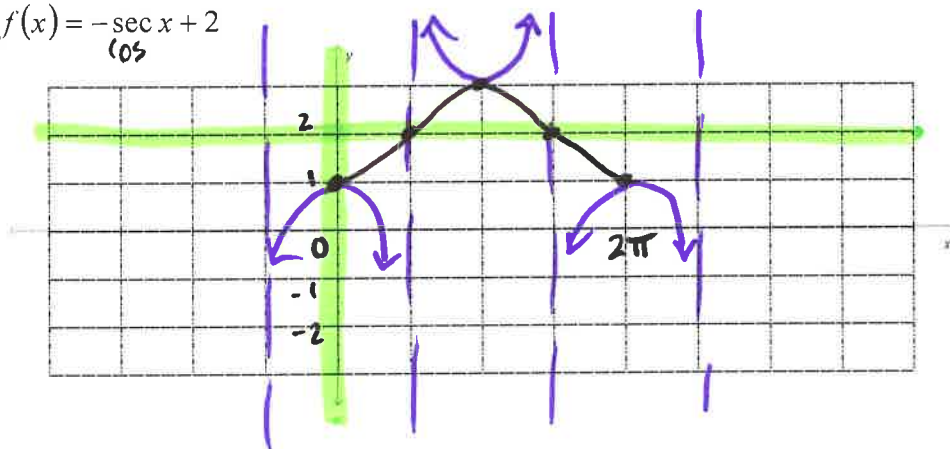
Vertical Shift:

Down 1

Phase Shift:

$\frac{-\frac{\pi}{2}}{\frac{1}{2}} = \frac{-2\pi}{2} = -\pi$  Right

5.  $f(x) = -\sec x + 2$   
(os)



$|a| = 1$

Period =  $2\pi$

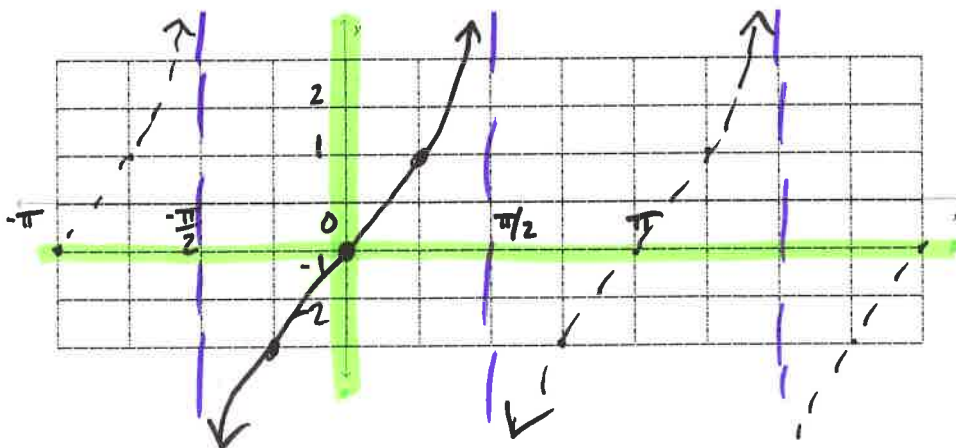
Frequency =  $\frac{1}{2\pi}$

Vertical Shift:

Up 2

Phase shift: 0

6.  $f(x) = 2 \tan(x + \pi) - 1$



$|a| = 2$

Period =  $\pi$

Frequency =  $\frac{1}{\pi}$

Vertical Shift:

Down 1

Asymptotes:

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

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

$\frac{\pi}{2} - \pi$

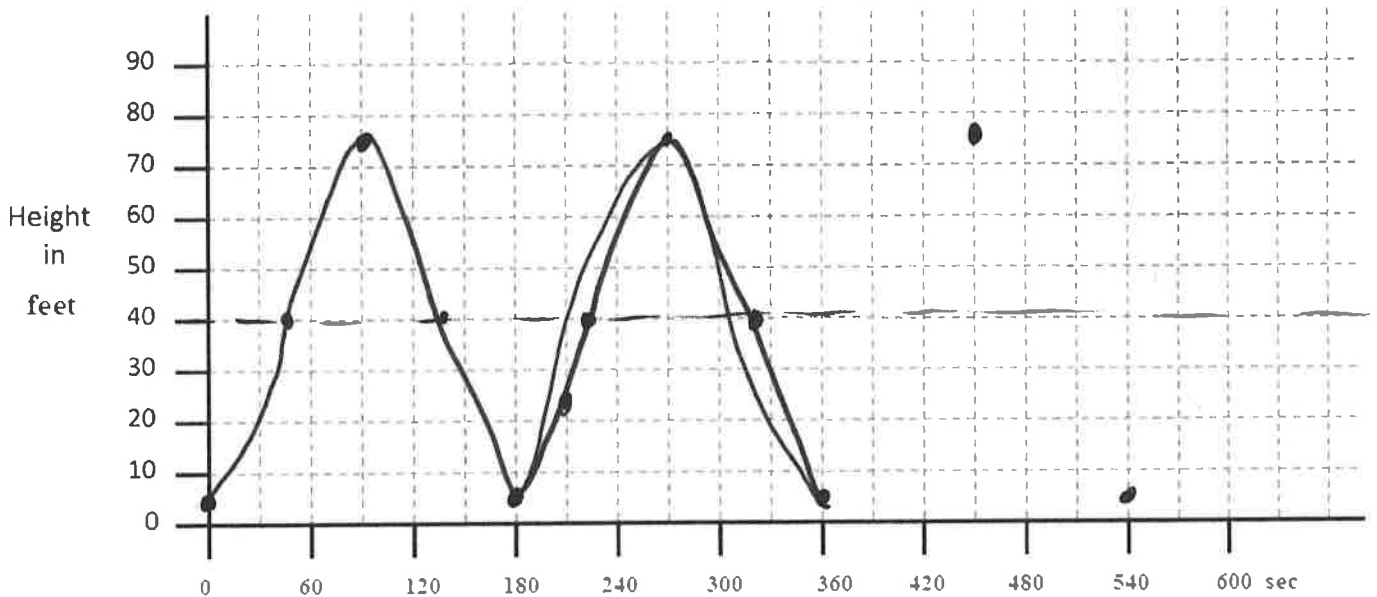
$\frac{\pi}{2} - \pi$

$$a = 35$$

$$\text{ANA. } \frac{1 \text{ rot}}{180 \text{ s}} = \text{freq.}$$

7. A Ferris wheel is 70 feet in diameter and rotates once every 180 seconds. The center axle of the wheel is 40 feet from the ground. Assume the wheel starts rotating passenger is at the bottom. Write an equation that models the motion of the passenger on the Ferris wheel. Graph the function and determine the height of the passenger at  $t = 210$  seconds.

Equation  $h = 40 - 35 \cos \frac{\pi}{90} t$  OR  $-35 \cos \frac{\pi}{90} t + 40$



$$\text{Find } h(210) = 40 - 35 \cos \left( \frac{\pi}{90} \cdot 210 \right) = 22.5'$$

$$\frac{1}{180} = \frac{2\pi}{\omega t}$$

$$360\pi = \omega t$$

$$\frac{1}{180} = \frac{\omega}{2\pi}$$

$$180\omega = 2\pi$$

$$\omega = \frac{\pi}{90}$$

$$\text{OR } \frac{180}{1} = \frac{2\pi}{\omega}$$