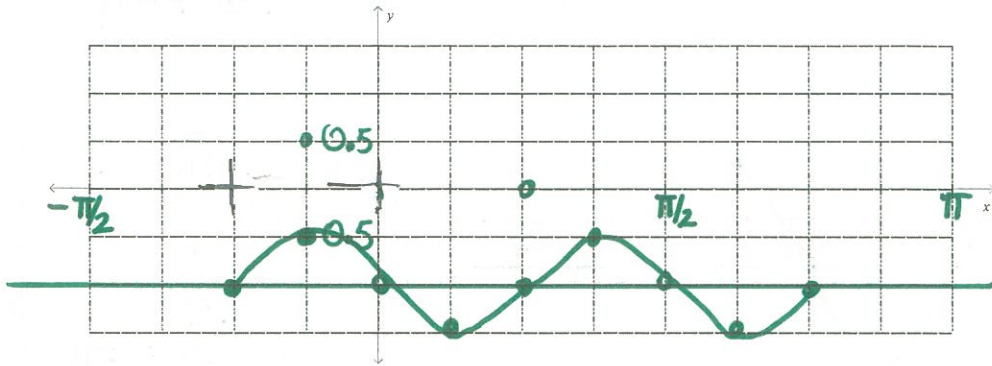


# HPC Trig Graphs & Simple Harmonic Motion Review

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



$|a| = 0.5$

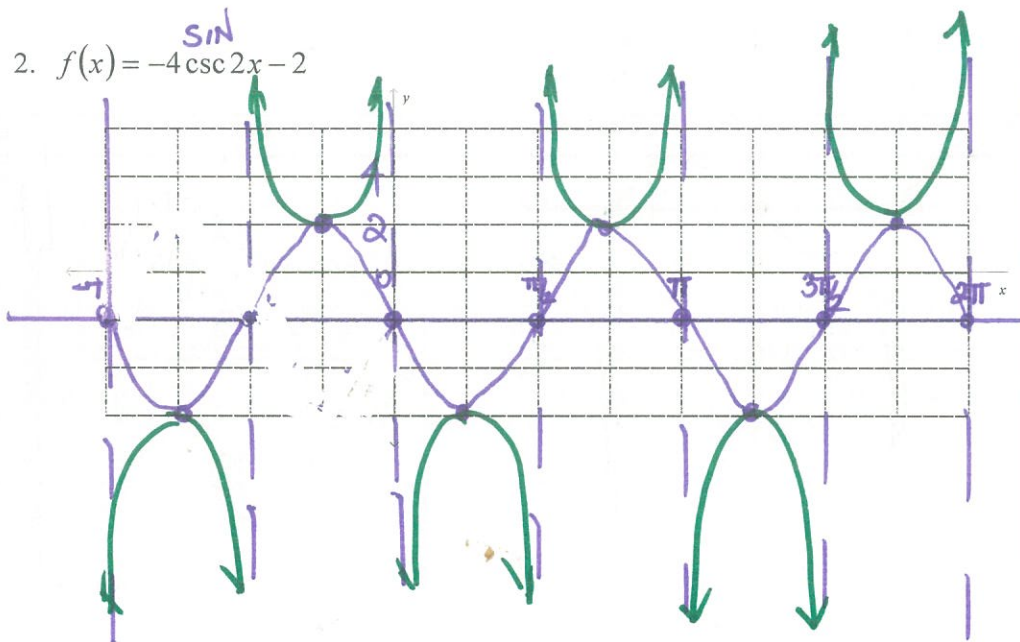
Period =  $\frac{\pi}{2}$

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

Vertical Shift:  $\downarrow$

Phase shift:  $\frac{\pi}{4}$  or  $\frac{\pi}{4} \leftarrow$

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



$|a| = 4$

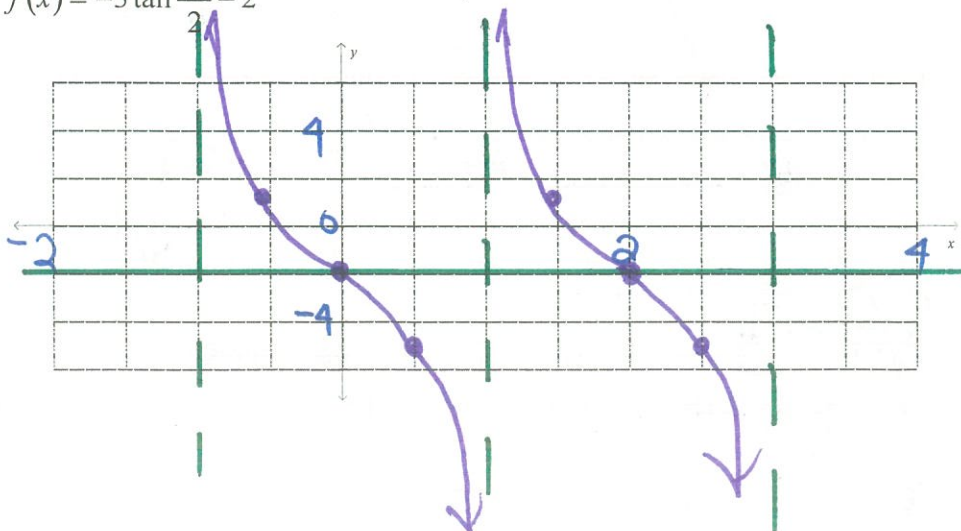
Period =  $\pi$

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

Vertical Shift:  $\downarrow 2$

Phase shift:  $\emptyset$

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



$|a| = 3$

Period =  $2$

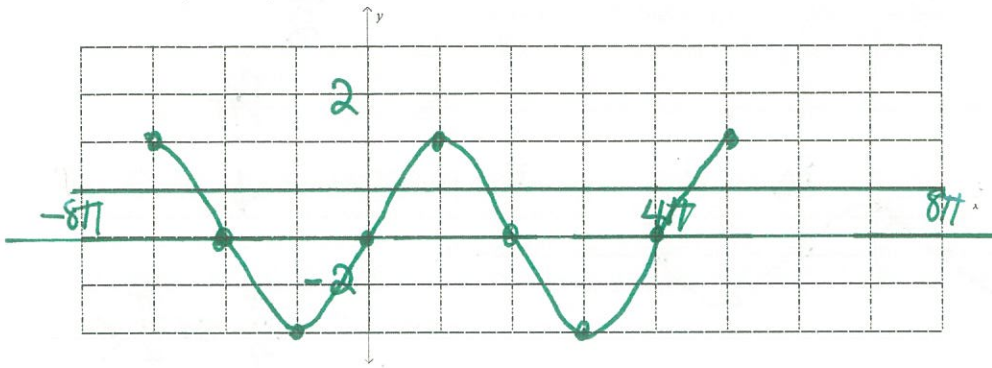
Frequency =  $\frac{1}{2}$

Vertical Shift:  $\downarrow 2$

Asymptotes:

$-1 < x < 1$

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



$|a| = 2$

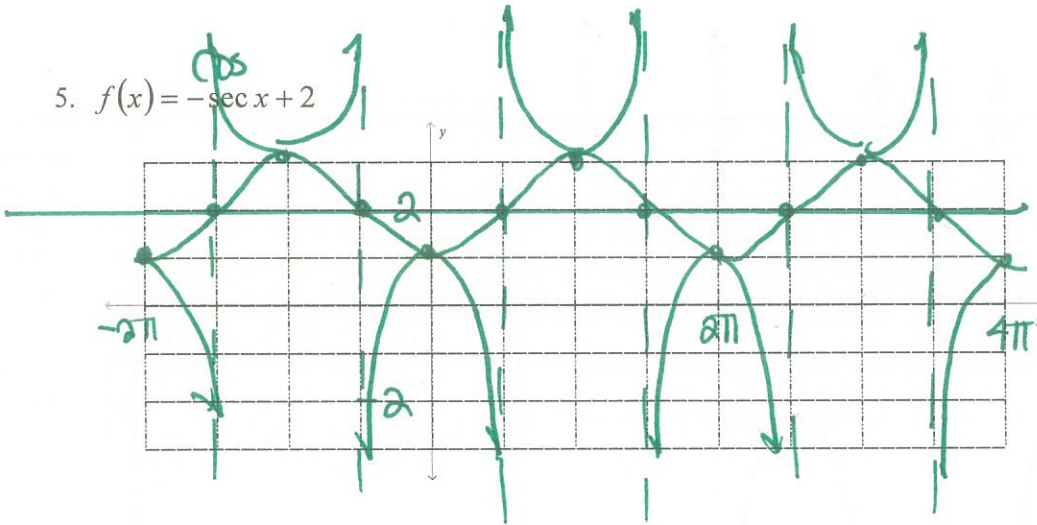
Period =  $\frac{2\pi}{\frac{1}{2}} = 4\pi$

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

Vertical Shift:  $\downarrow 1$

Phase Shift:  $\frac{\frac{\pi}{2}}{\frac{1}{2}} = \pi$

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



$|a| = |-1| = 1$

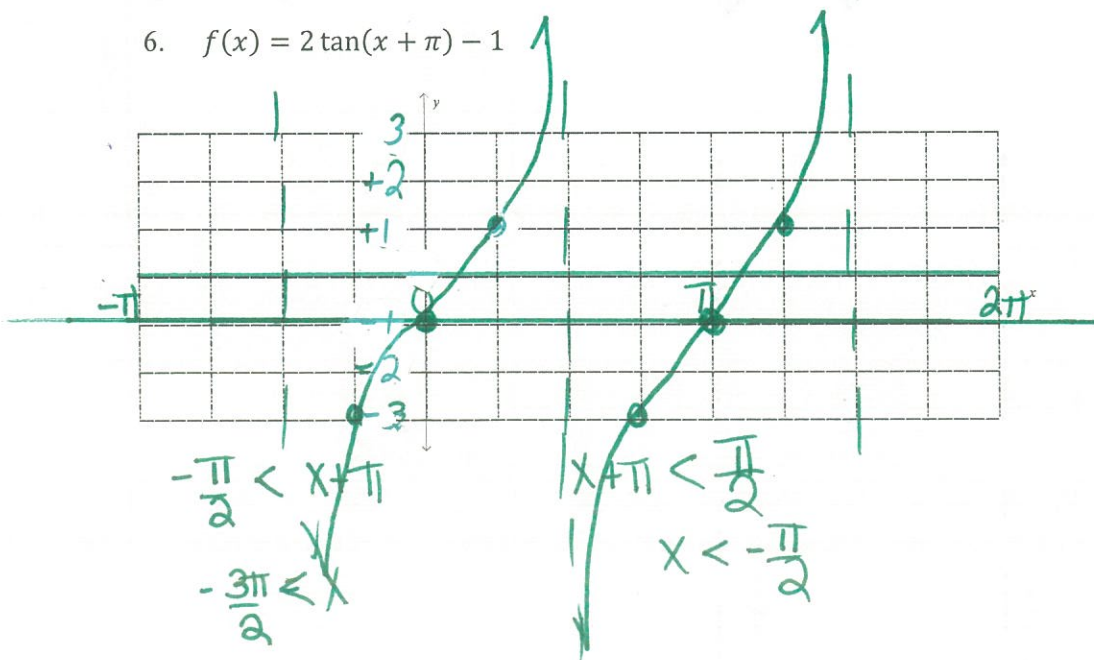
Period =  $2\pi$

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

Vertical Shift:  $\uparrow 2$

Phase shift:  $\emptyset$

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



$|a| = 2$

Period =  $\pi$

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

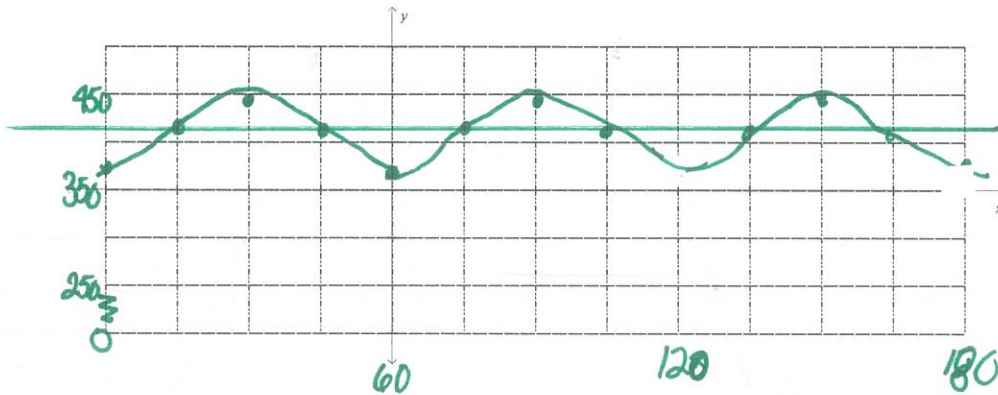
Vertical Shift:  $\downarrow 1$

Asymptotes:

8. In a commercial bakery, the average oven temperature is highest in the middle of a bake cycle and lowest at the beginning, ranging from 371°F to 447°F. A bake cycle lasts for 60 minutes. Write a function that models the change in temperature according to time of the bake cycle. Explain the process used for determining which trigonometric function to use as well as the methods for finding the amplitude and the b value of the function.

Equation:  $T(t) = -38 \cos 6t + 409$   
 $T(t) = -38 \cos \frac{\pi}{30}t + 409$

Graph the function.



Find  $T(30) =$  \_\_\_\_\_

$$p = 60$$

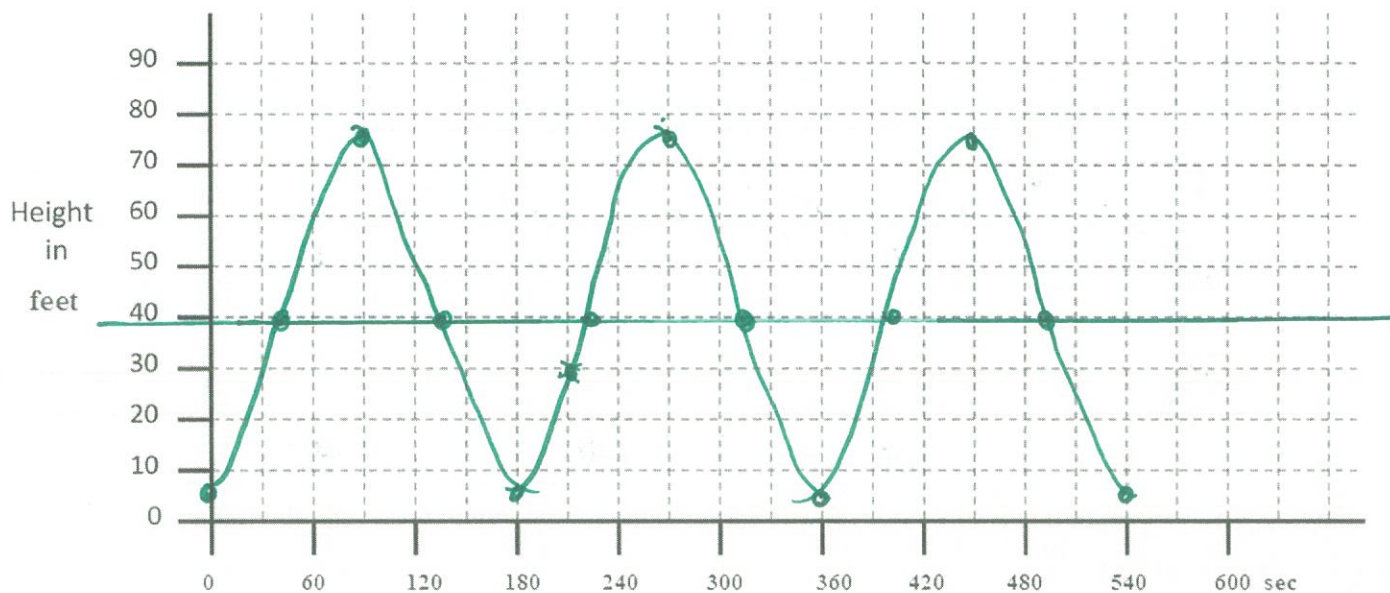
$$\text{amp} = \frac{447 - 371}{2} = \frac{76}{2} = 38$$

$$VS = 371 + 38 = 409$$



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 with a passenger 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  $h(t) = -35 \cos 2\pi t + 40$  or  $h(t) = -35 \cos \frac{\pi}{90} t + 40$



Find  $h(210) = 5$  ft (per graph)

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

(per calculator)