1. Graphing the parent functions

a. Graph the y= sin x function

b. Graph the y = cos x function

c. Graph the y = sec x function

d. Graph the y = csc x function

e. Graph the y = tan x function

f. Graph the y = cot x function

2. Graphing transformations of these functions (level of difficulty on test models that of these Q's)

a. Graph $y = -2\cos(x) + 4$

b. Graph $y = \sin(x - \pi) - 3$

c. Graph $y = -\sin(2x)$

d. Graph $y = 3\cos(\frac{1}{2}\pi x + \pi)$

e. Graph $y = -3\sec x$

f. Graph $y = \csc(x + \pi/2)$

g. Graph $y = -\tan x$

3. Write the equation of the function given the following information

a. Write the equation for the sine function with amplitude of 7, a vertical shift of 2, a period of 4 and no phase shift.

b. Write the equation of the cosine function that is reflected vertically, has a midline at y = -2, a period of 2π, where the distance from the highest point (local max) to the lowest point (local min) is 8.

— Side question – What are the highest and lowest values in the above function?

c. Write the equation for the secant function that has a period of 8π, an amplitude of 3, a midline of y = 9, and a phase shift of 2π units to the RIGHT.

d. Write the equation of the sine function that fluctuates between a height of 7 and -1, that completes a full revolution in 10 minutes, has a phase shift of 5 units to the LEFT.

4. Analyze information about a function given the equation for this function.

a. Given $y = 5\sin(4\pi x + \pi) - 1$ identify the period, the midline equation, the phase shift, the highest y-value, and the lowest y-value.

b. Given $y = 4\cos(2x) + 3$ identify what height the function is at when $x = 0, \pi/2, \pi$, and 3.8.

— Side Question – Name an x-value that would yield a local maximum for this function.

5. Word problems

a. Given a Ferris wheel that is centered 75 feet above the ground with a radius of 65 feet. This Ferris wheel takes 4 minutes to complete a full rotation. If you enter the Ferris wheel on the bottom then write the equation that best models this function as height (feet) vs. time (minutes). ** Hint, draw this function so that you can best identify if it is the sine or cosine function.

— Side Question – How long in minutes would it take you to get to the top of the Ferris Wheel?

— Side question #2 – What is this height at the top of the Ferris Wheel?

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b. Given a Ferris wheel that is centered directly at ground level (meaning half of the Ferris wheel goes below ground – you can assume that the amusement park constructed a slit-like hole in the ground to allow the Ferris wheel to go below ground – creating a more exciting ride). This Ferris wheel has a radius of 15 meters. You enter the Ferris wheel at ground level (the equilibrium) <u>as the wheel is on its way up</u>. It takes 8π minutes to return you to where you started. Write the equation that best models this information. ** Hint, again, draw this function as height (meters) vs. time (minutes) to help you identify if it is a sine or cosine function.

c. Given the function $y = 3\sin(\pi m/6) + 6$ that represents the average rain fall in inches each month (with m representing the month (m= 1 is January, m = 2 is February …)).

What is the maximum rainfall in any given month? What month does this occur?

What is the minimum rainfall in any given month? What month does this occur?

** Hint – find out what is a full period (in months), identify the length of time for each major interval of the sine function, and then reflect upon where the sine function is at its min and max…