

Part I: Sketch a graph of the following without using your calculator. Graph in radians and graph 2 periods! Make sure you label scales on BOTH axes. Plot critical values as well. NO CALCULATOR!

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

2) $y = \frac{1}{2} \sin \left(2x - \frac{\pi}{4} \right) + 1$

Part II: Without using your calculator, solve the equations over the given interval. Express your answers in radians.

4) $\sin x = \frac{1}{2}, [0, 2\pi]$

5) $\cos x = -\frac{\sqrt{2}}{2}; \frac{\pi}{2} \leq x \leq \pi$

6) $\tan x = 1; 0 \leq x \leq 2\pi$

7) $\csc x = -2, [0, 2\pi]$

Part III: Use a calculator to solve the following equations over the given interval.

9) $\sin x = \frac{3}{4}; 0 \leq x \leq \frac{\pi}{2}$

10) $\cos x = \frac{2}{3}; 0 \leq x \leq 2\pi$

11) $\csc x = -1.5; \pi \leq x \leq \frac{3\pi}{2}$

Part IV: Write a sinusoidal equation to describe the following situations. Then, use your equation to answer the accompanying questions.

12) A Ferris wheel is 80 feet in diameter and its center is 45 feet above the ground. It takes the Ferris wheel 1.5 minutes to complete a revolution.

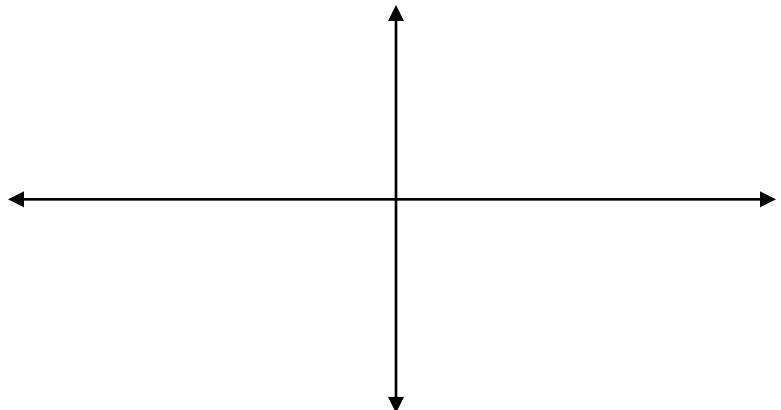
a) Equation: _____

b) After how many **seconds** will the rider be at a height of 50 feet? _____

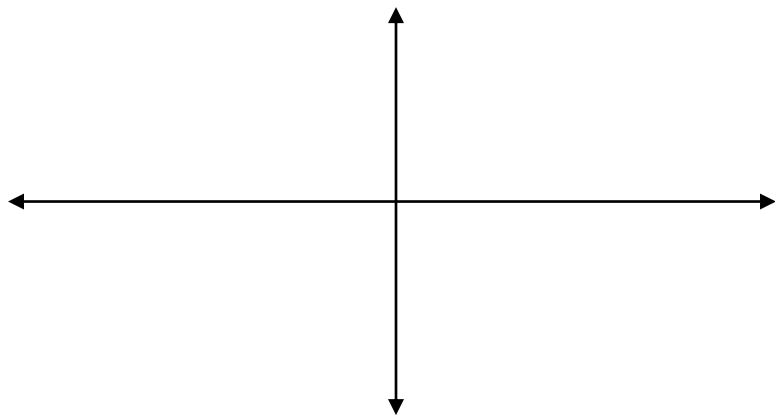
c) How high will the rider be after 1 **minute** into the ride? _____

Part V: Sketch 2 periods of each of the following functions. Plot specific points and be as accurate as possible. (No calculator!)

14) $y = -4 \tan 2x - 1$



15) $y = 3\sec\frac{x}{4} + 2$



Part VI: Find the exact values of each of the following. Remember to keep in mind the domains and ranges for the inverse functions. (No Calculator)

16) $\cos^{-1}\left(\frac{\sqrt{2}}{2}\right)$

17) $\tan^{-1}(-1)$

18) $\sec\left[\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)\right]$

19) $\sin[\tan^{-1}(1)]$

Part VII: Write an equation for the graph.

