Worksheet 8

MATH 006B - Schmidt

Winter 2021

Instructions:

- **Show ALL your work to receive credit!** Cross off anything you do not wish to be graded.
- Simplify your answers as much as possible. For instance, evaluate 2^2, but not $\sqrt{2}$.
- **Work with your group** on the following exercises. Each of you will turn in your own work via Gradescope.
- **Your group** may ask the TA questions, which the TA will answer with leading questions (not answers) to help guide you to the answer.

$V = A\cos(b(x+c)) + D$

1. (7 points) The function $f(x)$ graphed below is either of the form $f(x) = a\cos(bx - h) + k$ or the form $f(x) = a\sin(bx - h) + k$, for some constants a, b, h, and k. You may assume $b > 0$.
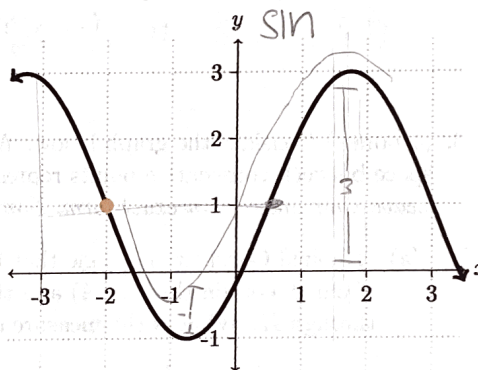
   (a) (1 point) Find the amplitude of f.

   $A \rightarrow$ amplitude   Max: 3 $\frac{3-1}{2} \rightarrow \frac{2}{2} \rightarrow 1$

   $\frac{\text{max} - \text{min}}{2}$ Min: -1

   (b) (1 point) Find the midline of f.

   $\frac{3+1}{2} \rightarrow \frac{4}{2} \rightarrow 2$

   (c) (1 point) Find the period of f.

   $0.5 - (-2) = 2.5$

   y sin

   (d) (1 point) Using the orange point as the "starting point" for one period, what is the horizontal shift (assuming this shift happens *after* any horizontal stretch/compression)?

   horizontal shift: 2   Shift to the left 2

   (e) (3 points) Use the above information to write a function formula for $f(x)$.
   *Remember that we are using the orange marked point as the "starting point" for one period.*

   $f(x) = 1\sin(2x - 2s)$ $\frac{2\pi}{5}$

1

2. (3 points) Jorge is seated on a ferris wheel at the 9 o'clock position when the wheel begins rotating counter-clockwise. The wheel has a radius of 62 feet and the bottom of the wheel is 3 feet above ground.

(a) (2 points) How high above ground (in feet) is Jorge after he has swept out θ radians?

radius: 62

above ground: 3ft

62t

9'0'

62

I 3A
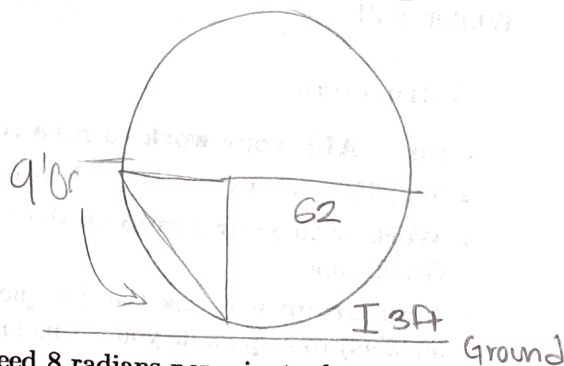
Ground

(b) (1 points) If the ferris wheel rotates with angular speed 8 radians per minute, how high above ground (in feet) is Jorge t minutes after the wheel begins rotating?

angular speed: 8 $f(t) = t + 62$ from ground

$f(t) = 62 \sin(8t) + 3$

3. (4 points) Consider the graph below. Assume the points on the curve are evenly spaced and so the space between consecutive points represents $\frac{1}{9}$th of a quarter circle. Leave your answers in exact form. Some may involve trigonometric functions.

(a) (1 point) Consider the angle that is formed by the initial ray (from the origin through A) and the ray from the origin through H. What is the measure of this angle in radians?

$\frac{1}{9} + h$
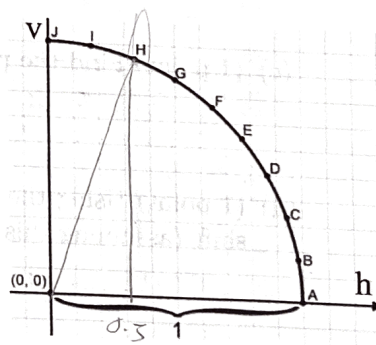
(b) (2 points) What are the coordinates of the point H?

(c) (1 point) What is the slope of the ray from the origin through the point H?

4. (1 point) Participation – no submission

2