

**A. Multiple Choice: Please circle your choice**

1. What are the peaks of a periodic function?
  - a. the extremes of the graph
  - b. the lowest points of the graph
  - c. the highest points of the graph
  - d. the x-intercepts of the graph
  
2. What is the equation of the central axis?
  - a. the horizontal line that intersects the maximum value of a periodic function
  - b. twice the sum of the maximum and minimum functional values
  - c. the y-intercept of a periodic function
  - d. the horizontal line halfway between the maximum and minimum value of a periodic function
  
3. Which of the following situations would produce a periodic graph?
  - a. passing a basketball, but the ball misses the target and just bounces along the ground
  - b. a machine that cuts a board every 10 s
  - c. a biker's pace through a mountainous terrain
  - d. jumping as high as you can for 10 straight minutes
  
4. Which of the following situations would not produce a periodic graph?
  - a. A nail is stuck in the wheel of a car moving at a constant velocity.
    - independent variable: time
    - dependent variable: height of nail above ground
  
  - b. Waves move past a dock post in the ocean during stormy weather.
    - independent variable: time
    - dependent variable: height of water on post
  
  - c. A pendulum swings in a grandfather clock.
    - independent variable: time
    - dependent variable: horizontal distance of pendulum from center of clock
  
  - d. A piston moves back and forth in the engine of a train travelling at a constant velocity.
    - independent variable: time
    - dependent variable: horizontal position of piston

**B. True or False: Circle your choice for each statement.**

- |   |      |       |
|---|------|-------|
| a. A Periodic Function only repeats sometimes.              | True | False |
| b. Given $y = -3\sin(2x) + 5$ , the amplitude is $-3$ .     | True | False |
| c. Sinusoidal functions have a domain of "all real numbers" | True | False |
| d. Sine graphs can start at the peak or trough.             | True | False |

- e. A cycle is a portion of the periodic graph that repeats. True False
- f. A sinusoidal function is not a periodic function. True False
- g. This unit has been “fun”. True False

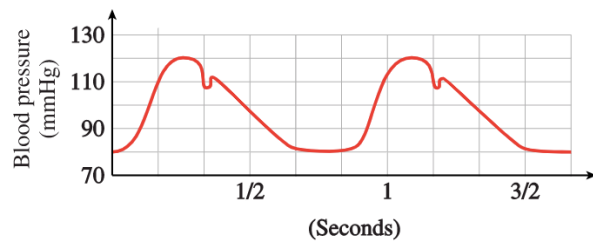
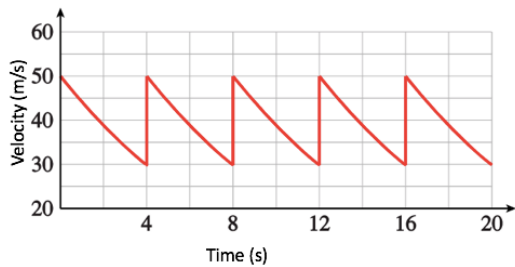
C. i. What is the domain and range of the function  $f(x) = \sin(x)$ ?

ii. What is the domain and range of the function  $f(x) = \cos(x)$ ?

D. Are the following scenarios periodic or not periodic? Explain the reason for your choice.

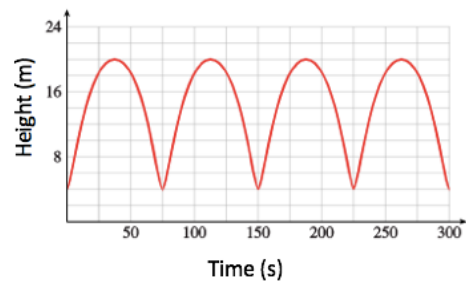
- a) The height of the tides in the bay of Fundy
- b) The value of a stock
- c) The height of a child on a swing

E. What are the period and amplitude of the following functions?



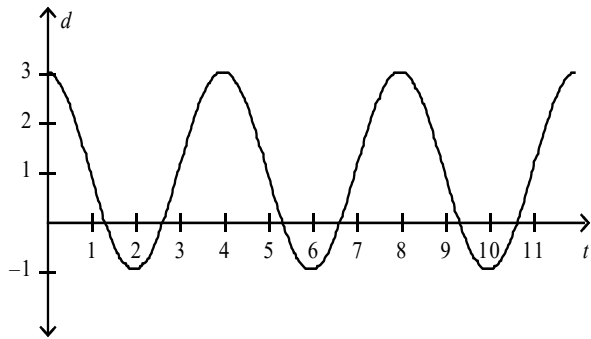
F. The following graph illustrates a graph of the height of a ball that is bouncing on a surface.

- a) What is the period of this function?
- b) What is the amplitude of this function?
- c) What is the equation of central axis?



d) What is the range?

**G.** A scientist records the motion of a particle. A graph of that motion is shown below.

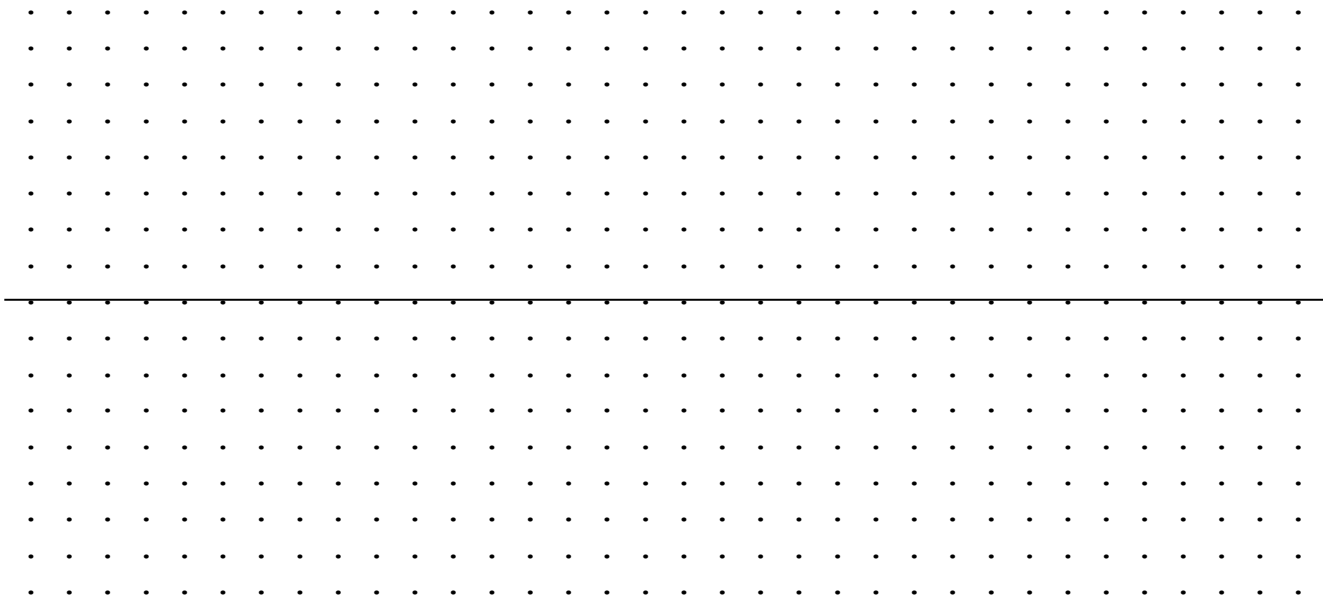


- What is the period of one complete cycle?
- What is the range of this function?
- If the particle can survive for twenty complete cycles before deteriorating, determine the domain of the function.
- Determine the equation of the central axis.
- Determine the amplitude.
- Determine an equation of the function that models this graph.

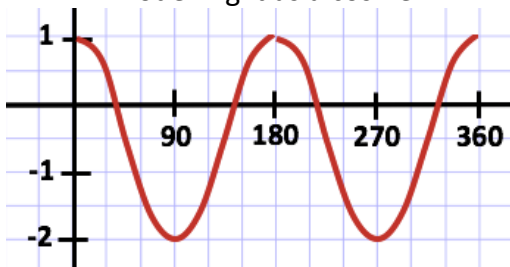
**H.** State the transformations and sketch a graph for:

1.  $f(x) = -3\cos(x - 60) + 1$

2.  $g(x) = -2\sin(2(x + 30))$



I. State two equations for the following function: one modelling it as a sine function, and the other modelling it as a cosine.



J. State two equations for the following function: one modelling it as a sine function, and the other modelling it as a cosine.

