

Name _____ Per _____



LO: I can identify **zeros**, **maximum values**, **minimum values** on a function graph. I can use a graphing calculator to find these values and sketch a graph.

DO NOW On the back of this packet

(1) **Need to Know: Zeros, maximum, minimum, turning points, increasing, decreasing**

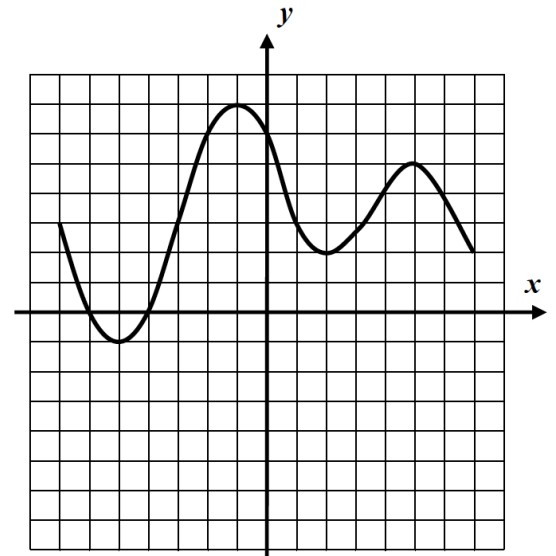
There is a lot of terminology associated with the **graph of a function**. Many of the terms have names that are descriptive, but still, work is needed to master the ideas.

Exercise #1: The function $y = f(x)$ is shown graphed below over the interval $-7 \leq x \leq 7$.

- (a) Find the maximum and minimum values of the function. State the values of x where they occur as well.

- (b) What is the y -intercept of the function? Explain why a function cannot have more than one y -intercept.

- (c) Give the x -intercepts of the function. These are also known as the function's **zeros** because they are where $f(x) = 0$.



- (d) Would you characterize the function as **increasing or decreasing** on the domain interval $-5 \leq x \leq -1$? Explain your choice.

- (e) one additional interval over which the function is increasing and one over which it is decreasing.

Increasing: _____

Decreasing: _____

- (f) The following points are known as **turning points**. Each can be classified as a **relative maximum** or a **relative minimum**. State which you think each is.

$(-5, -1)$

$(-1, 7)$

$(2, 2)$

$(5, 5)$

relative minimum

relative minimum

relative minimum

relative minimum

or

or

or

or

relative maximum

relative maximum

relative maximum

relative maximum

□ (3) **Functions: Use a calculator to locate key points and draw a graph**

Graphing calculators are powerful tools in our exploration of functions and the rules that define them. Because calculators are so good at doing calculations, it is fairly easy to have them evaluate **expressions** that are the **rules** for generating the **outputs** for the functions. Throughout this entire lesson, we will assume that you have a calculator that can do the following:

GRAPHING CALCULATOR ESSENTIALS

1. A TABLE APP

AND

2. A GRAPHING APP

We can use our calculator to help us produce tables that are very useful in plotting graphs and exploring functions.

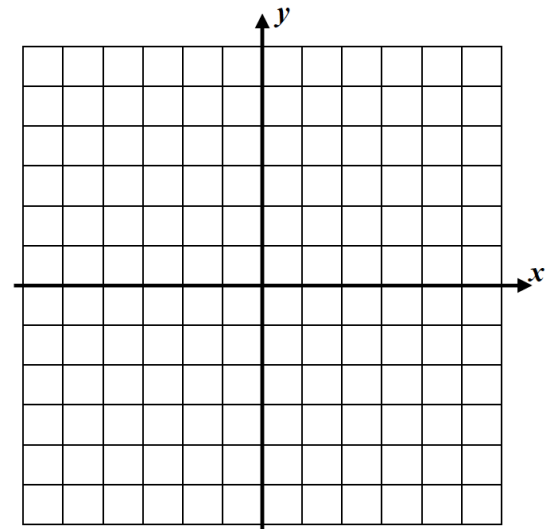
Exercise #1: Consider the linear function $f(x) = \frac{1}{2}x + 2$. Do the following by using your graphing calculator's table function.

(a) Evaluate $f(-6)$, $f(0)$ and $f(8)$.

(b) Explore the table to determine the value of x for which $f(x) = 11$.

(c) Use the table to fill out the following table and graph the function on the grid for the interval $-6 \leq x \leq 6$.

x	y	(x, y)
-6		
-4		
-2		
0		
2		
4		
6		



(d) Graph the linear function $g(x) = 5 - x$ on the same set of axes and find where the two lines intersect.

(e) Show that the point that you found in (d) is a solution to both equations:

$$y = \frac{1}{2}x + 2 \text{ and } y = 5 - x$$

(3) **Functions: Draw a function given its characteristics**

On the following set of axis, create the graph of a function $f(x)$ with the following characteristics:

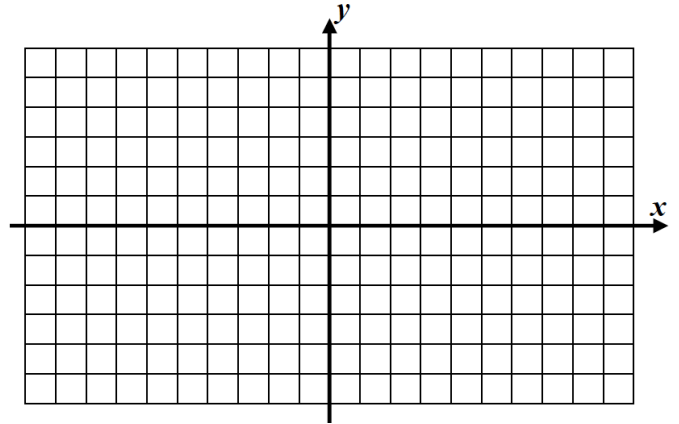
Passes through the points,

$(-8,0)$, $(5,-2)$ and $(8,3)$

Has an absolute maximum at $f(-4) = 5$

Has an absolute minimum at $f(2) = -6$

Decreasing on the interval on the interval $-4 \leq x \leq 2$



(5) **Exit Ticket**

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(6) **Homework**

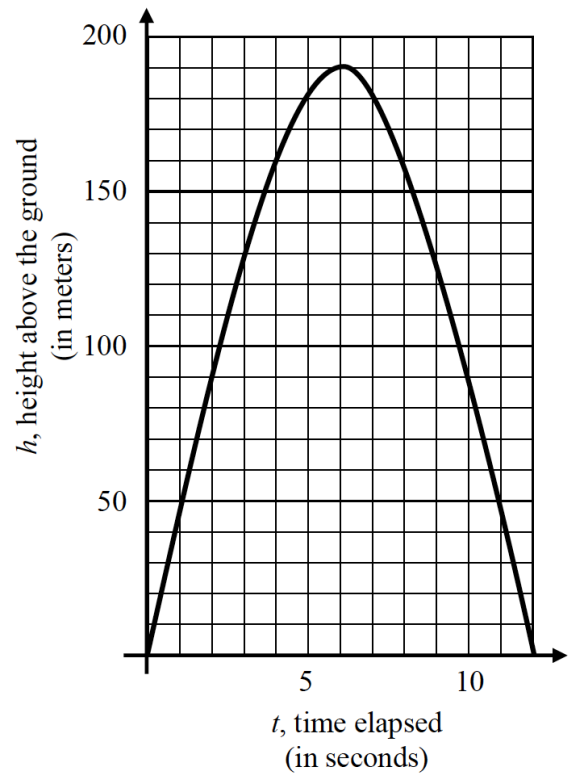
1. The following graph shows the height, h , above the ground of a toy rocket t seconds after it was fired. Use the graph of $h(t)$ to answer the following questions.

(a) What was the maximum height the rocket reached?
After how many seconds?

(b) How many seconds was the rocket in flight?

(c) Interpret $h(2) = 90$.

(d) Give the interval for t over which the height of the rocket is decreasing.

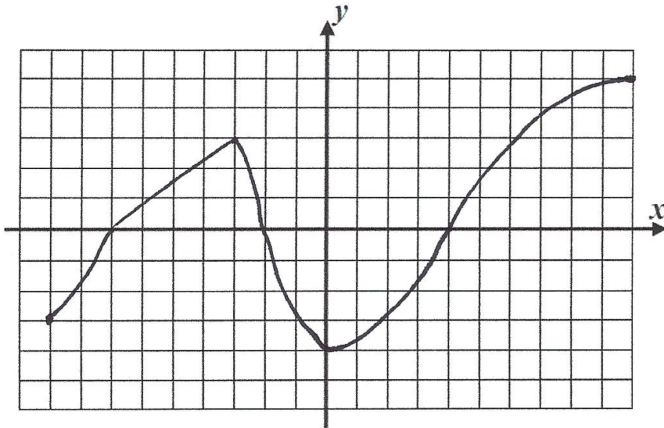


(4) Homework

cont.

For problems 2, 3, and 4, provide the information for each part of the graph listed to the right of the graph.

2.



x-intercept(s): _____

y-intercept: _____

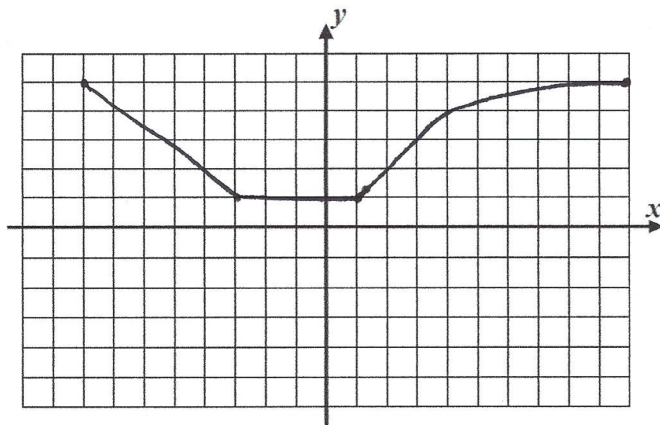
maximum: _____

minimum: _____

increasing: _____

decreasing: _____

3.



x-intercept(s): _____

y-intercept: _____

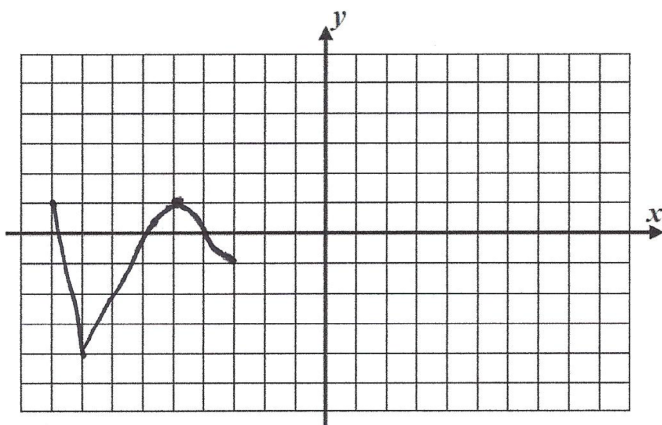
maximum: _____

minimum: _____

increasing: _____

decreasing: _____

4.



x-intercept(s): _____

y-intercept: _____

maximum: _____

minimum: _____

increasing: _____

decreasing: _____

(1) The LO (Learning Outcomes) are written below your name on the front of this packet. Demonstrate your achievement of these outcomes by doing the following:

Using the graph of the function $f(x)$ shown below, answer the following questions.

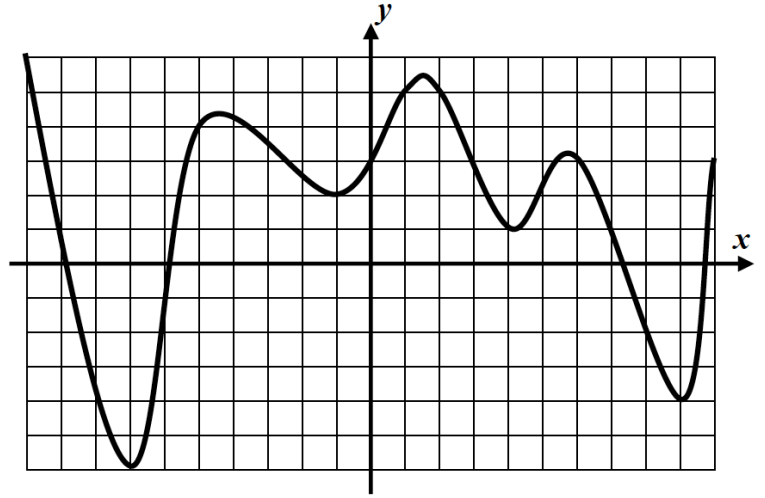
(a) Find the value of each of the following:

$$f(-7) = \quad f(0) =$$

$$f(4) = \quad f(9) =$$

(b) For how many values of x does $f(x) = 5$?

Illustrate on the graph.



(c) What is the y-intercept of this relation?

(d) State the maximum and minimum values the graph obtains.

(1) Solving progress: Solve one of the two problems below.

(a) $8x - 2 = -9 + 7x$

(b) $-18 - 6k = 6(1 + 3k)$

(2) Translation to algebra progress. Write an algebraic statement to represent this situation. Be sure to write a "Let" statement to define any variables.

The cost of renting a jet ski is \$40 per day plus \$50 per hour of use. How many hours was a jet ski rented if the total cost was \$390?

