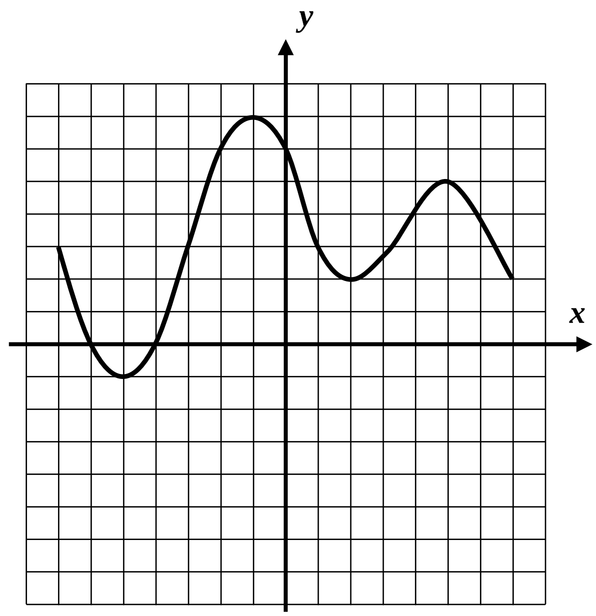
Name: ____________________________________ Date: __________________

GRAPHICAL FEATURES AND TERMINOLOGY
COMMON CORE ALGEBRA I

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 $-7 \le x \le 7$.



(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 **zeroes** because they are where $f(x) = 0$.

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

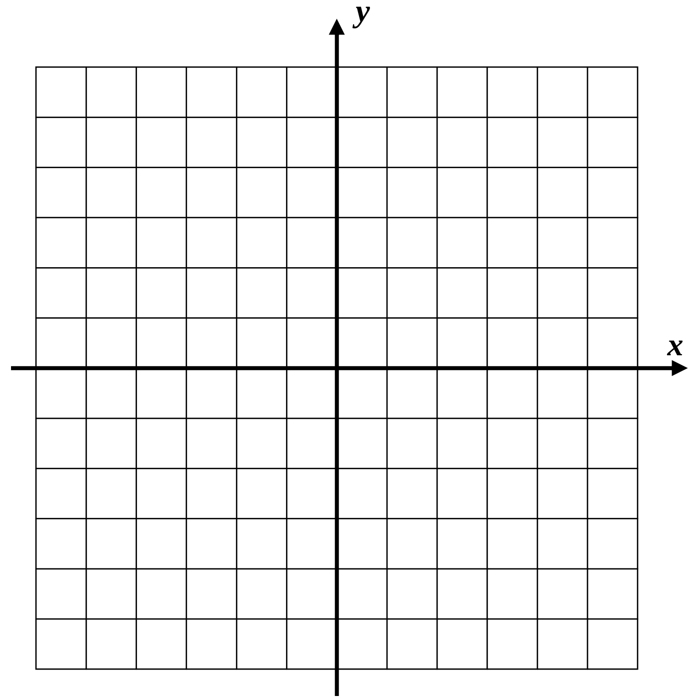
$(-5,-1)$	$(-1,7)$	$(2,2)$	$(5,5)$
relative minimum	relative minimum	relative minimum	relative minimum
or	or	or	or
relative maximum	relative maximum	relative maximum	relative maximum

Let’s get some more practice with **piecewise defined functions** and mix in our **function terminology** while we are at it.

***Exercise* #2:** Consider the **piecewise linear** function given the equation $f(x)=\begin{cases} x+3 & x\le 1 \\ 6-2x & x\ge 1 \end{cases}$.

(a) Create a table of values for this function below over the interval $-4\le x\le 4$. Then create a graph on the axes for this function.

x	Rule/Calculation	(x, y)
–4		
–3		
–2		
–1		
0		
1		
2		
3		
4		



(b) State the **zeroes of the function**.

(c) State the function’s *y*-intercept.

(d) Give the interval over which the function is increasing. Give the interval over which it is decreasing.

Increasing: ______________________

Decreasing: ______________________

(e) Give the coordinates of the one turning point and classify it as either a relative maximum or relative minimum.

(f) Use your graph to find all solutions to the equation $f(x)=2$. Illustrate your solution graphically and find evidence in the table you created.

(g) State the interval over which this function is positive. How can you tell this quickly from the graph?

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GRAPHICAL FEATURES
COMMON CORE ALGEBRA I HOMEWORK

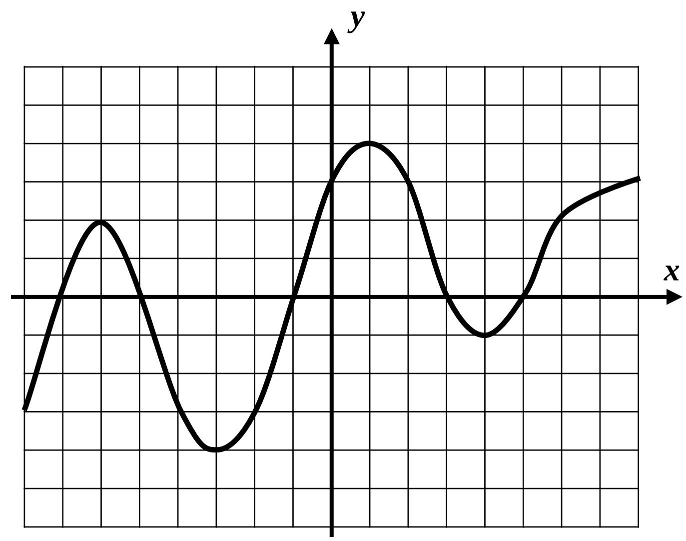
FLUENCY

1. The function $y = f(x)$ is shown graphed below over the interval $-8 \le x \le 8$.

(a) Evaluate each of the following;

$f(-2) =$ $\qquad$ $f(8) =$

$f(-8) =$ $\qquad$ $f(4) =$



(b) Find all the relative maximum and minimum values of the function. State the values of *x* where they occur as well.

(c) What are the absolute maximum and absolute minimum values of the function? At what *x*-values do they occur?

(d) What are the *x* and *y*-intercept(s) of the function? List each of the following as an ordered pair (*x*, *y*).

x-intercept(s): ______________________________ *y*-intercept(s): _________________________
(zeroes)

(e) Give an interval over which the function is increasing. Give an interval over which it is decreasing.

Increasing: ______________________

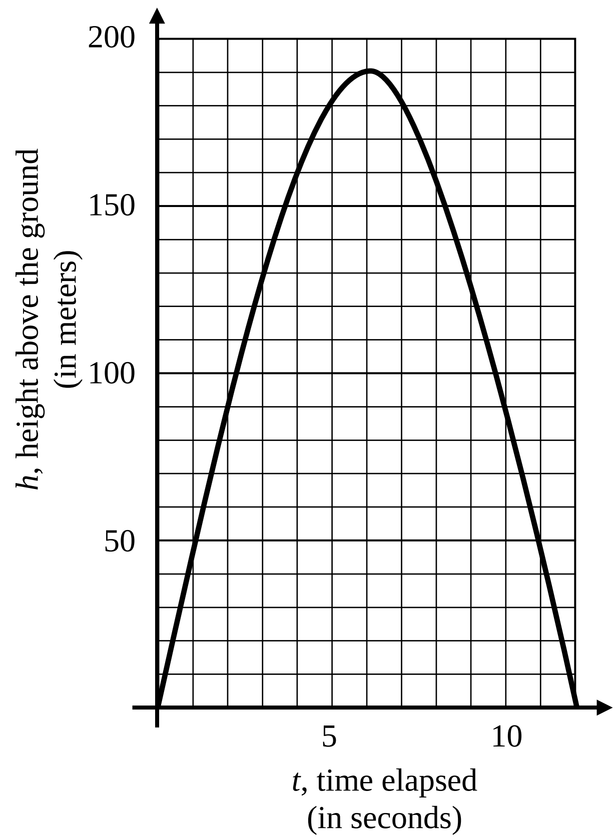
Decreasing: ______________________

(f) Use your graph to find all solutions to the equation $f(x) = 3$. Illustrate your solution graphically.

(g) Is the function positive or negative on the interval $-1 < x < 3$? How can you quickly tell?

APPLICATIONS

2. 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.

REASONING

3. 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 $-4 \le x \le 2$