Name: _____ Date: _____

GRAPHS OF FUNCTIONS
COMMON CORE ALGEBRA I

Graphs are one of the most powerful ways of visualizing a function's rule because you can quickly read **outputs** given **inputs**. You can also easily see features such as **maximum and minimum** output values. Let's review some of those skills in Exercise #1.

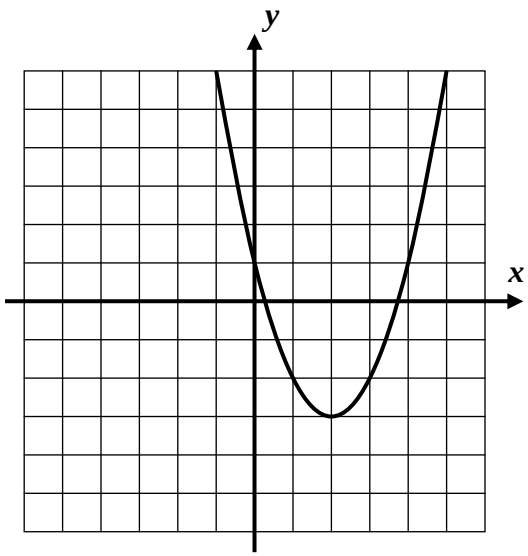
***Exercise* #1:** Given the function $y = f(x)$ defined by the graph below, answer the following questions.

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

$f(4) =$ $f(-1) =$

(b) For what values of x does $f(x) = -2$? Illustrate on the graph.

(c) State the **minimum** and **maximum values of** the **function**.



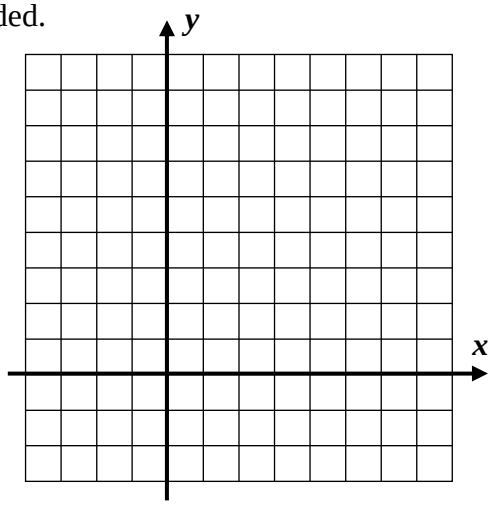
So, if we can read a graph to produce outputs (y-values) if we are given inputs (x-values), then we should be able to reverse the process and produce a graph of the function from its **algebraically expressed rule.**

***Exercise* #2:** Consider the function given by the rule $g(x) = 2x + 3$.

(a) Fill out the table below for the inputs given.

x	$2x+3$	(x, y)
–3		
–2		
–1		
0		
1		
2		
3		

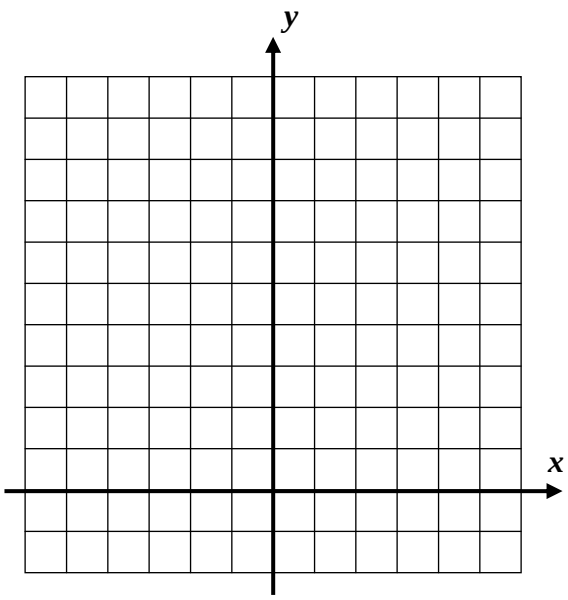
(b) Draw a graph of the function on the axes provided.



Never forget that all we need to do to **translate** between an equation and a graph is to **plot** input/output pairs according to whatever rule we are given. Let's look at a simple **non-linear** function next.

***Exercise* #3:** Consider the simplest **quadratic function** $f(x) = x^2$. Fill out the function table below for the inputs given and graph the function on the axes provided.

x	x^2	(x, y)
–3		
–2		
–1		
0		
1		
2		
3		



Sometimes the function's rule gets all sorts of funny and can include being **piecewise defined**. These functions have different rules for different values of x. These separate rules combine to make a larger (and more complicated rule). Let's try to get a feel for one of these.

***Exercise* #4:** Consider the function given by the formula $f(x) = \begin{cases} 2x+6 & x<0 \\ 6-x & x \geq 0 \end{cases}$. Your teacher will help you understand the notation of this function.

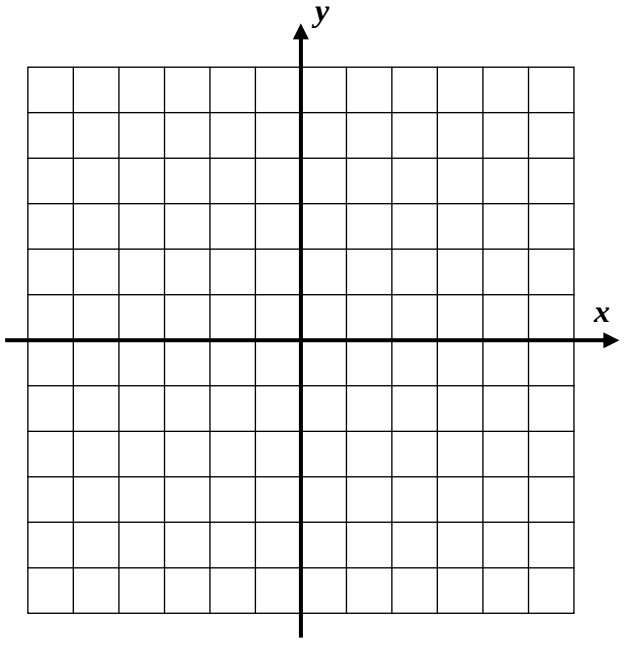
(a) Evaluate each of the following:

$f(4) =$ $f(-3) =$

(b) Fill out the table below for the inputs given. Keep in mind which formula you are using.

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

(c) Graph $y = f(x)$ on the axes below.

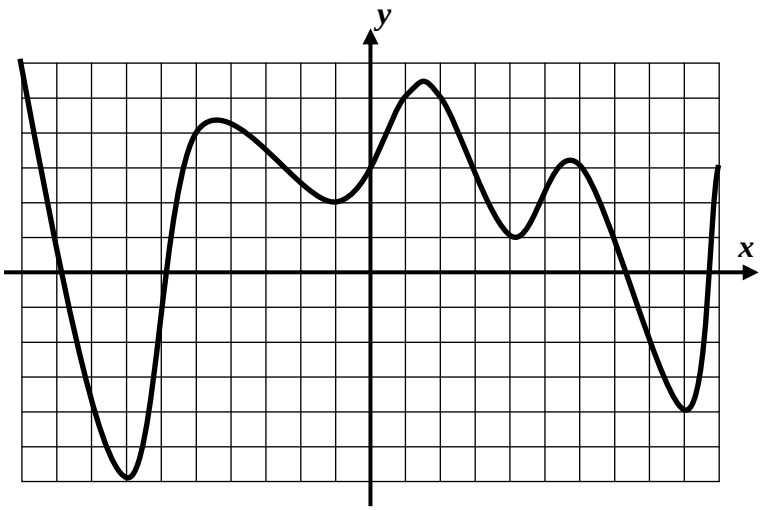


Name: _____ Date: _____

GRAPHS OF FUNCTIONS
COMMON CORE ALGEBRA I HOMEWORK

FLUENCY

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



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

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

$f(4) =$ $f(9) =$

(b) For how many values of x does $f(x) = 5$? Illustrate on the graph.

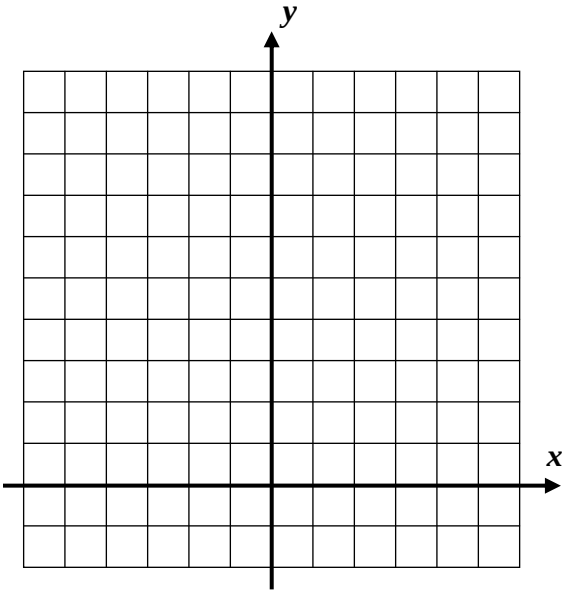
(c) What is the y-intercept of this relation?

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

(e) Explain why the graph above represents a function.

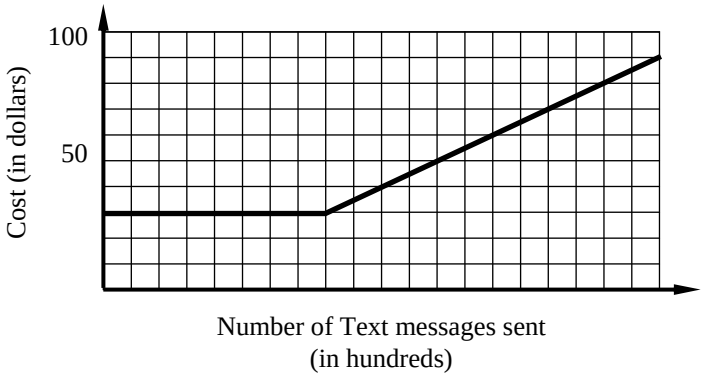
2. Consider the function $f(x) = 3(2-x) - 2$. Fill out the function table below for the inputs given and graph the function on the axes provided.

x	$3(2-x)-2$	(x, y)
–2		
–1		
0		
1		
2		



APPLICATIONS

3. The following graph represents the cost of a phone plan after a certain number of text messages used in a month. Analyze the graph to answer the following questions.



(a) How much would you have to pay if you used:

500 text messages _____

1800 text messages _____

(b) Interpret $f\left(1400\right)=60$

(c) What might have caused the graph to begin increasing at 800 text messages?

REASONING

4. Consider the following relationship given by the formula $f\left(x\right)=\begin{cases}3-2x & x\le 1\\ 2x-1 & x>1\end{cases}$.

(a) Evaluate each of the following:

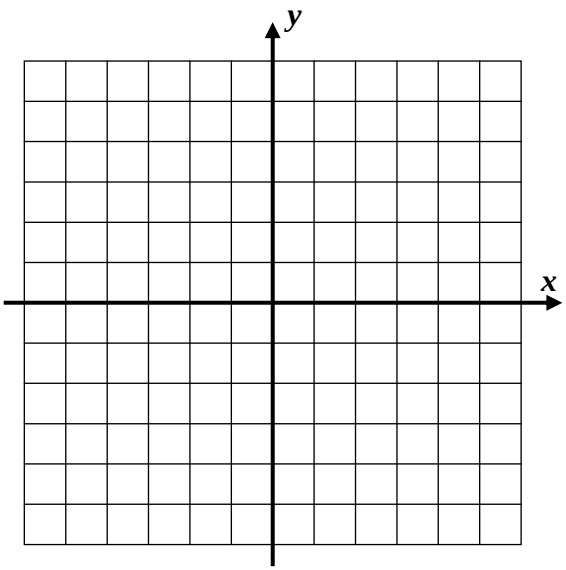
$f\left(5\right)=$ $f\left(-2\right)=$

(b) Carefully evaluate $f\left(1\right)$.

(c)Fill out the table below for the inputs given. Keep in mind which formula you are using.

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

(d) Graph $y=f\left(x\right)$ on the axes below.



(e) What is the minimum value of the function? Circle the point that indicates this value on the graph.