

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.

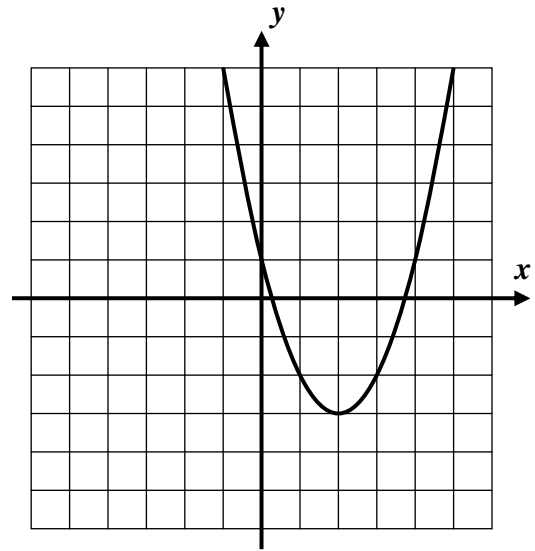
(a) Find the value of each of the following:

$$f(4) =$$

$$f(-1) =$$

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

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



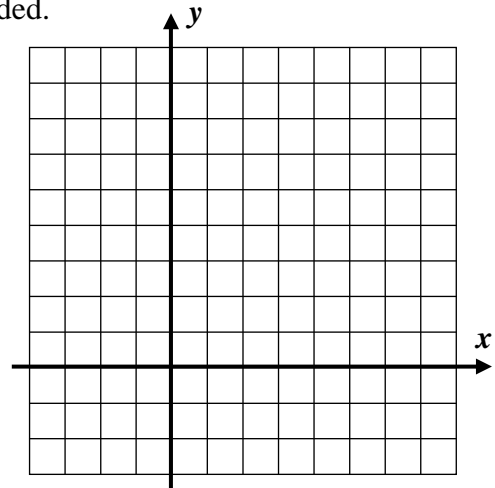
So, if we can read a graph to produce outputs (y -values) if we are given inputs (x -values), then we should be able to reverse the process and produce a graph of the function from its **algebraically expressed rule**.

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		

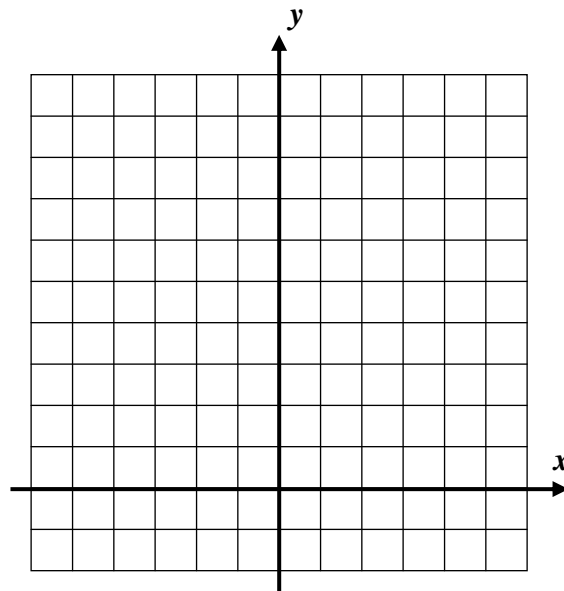
(b) Draw a graph of the function on the axes provided.



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:

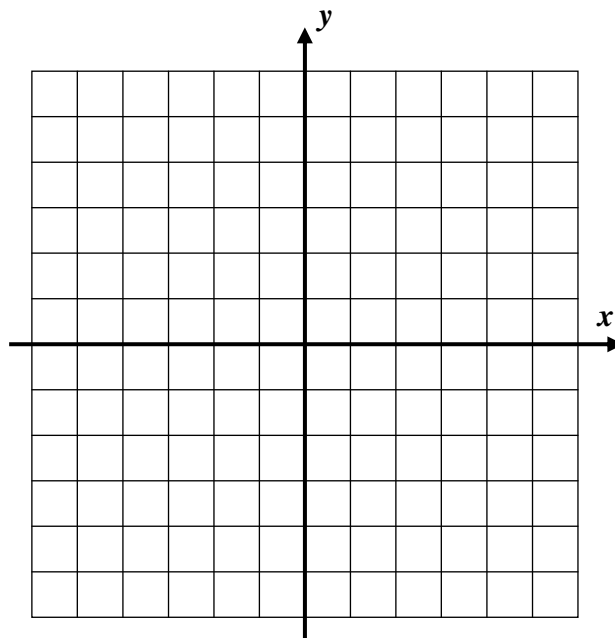
$$f(4) =$$

$$f(-3) =$$

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

(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		



GRAPHS OF FUNCTIONS
COMMON CORE ALGEBRA I HOMEWORK

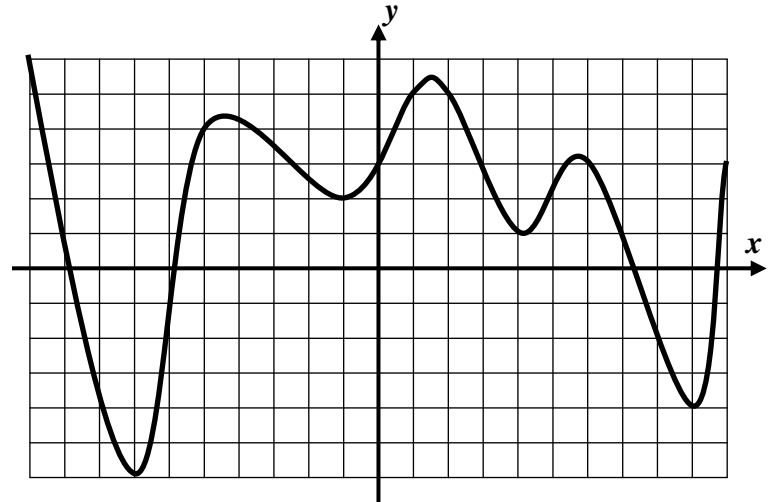
FLUENCY

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

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

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

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



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

Illustrate on the graph.

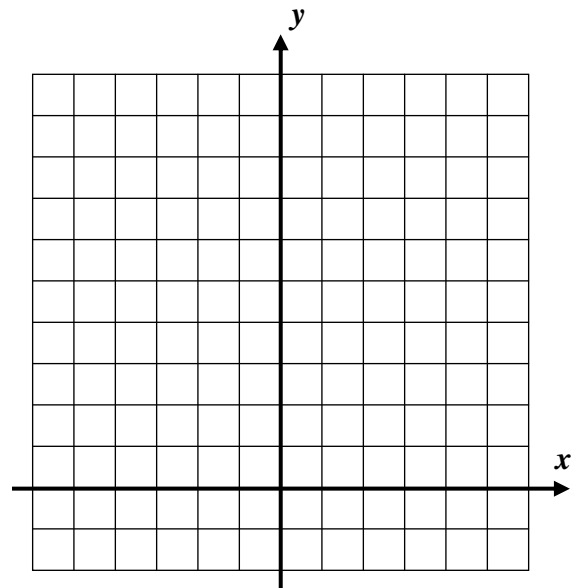
(c) What is the y-intercept of this relation?

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

(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

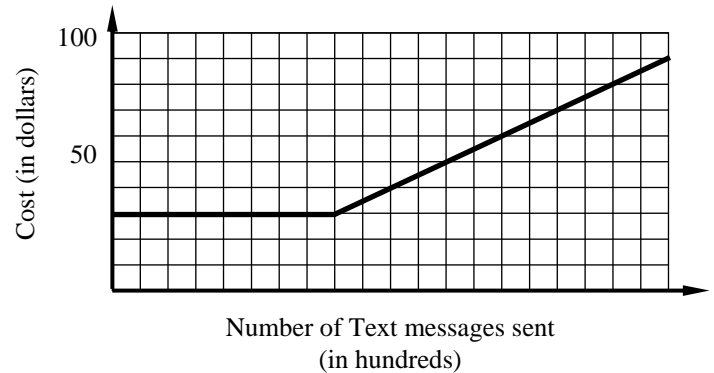
3. The following graph represents the cost of a phone plan after a certain number of text messages used in a month. Analyze the graph to answer the following questions.

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

500 text messages _____

1800 text messages _____

(b) Interpret $f(1400) = 60$



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

REASONING

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

(a) Evaluate each of the following:

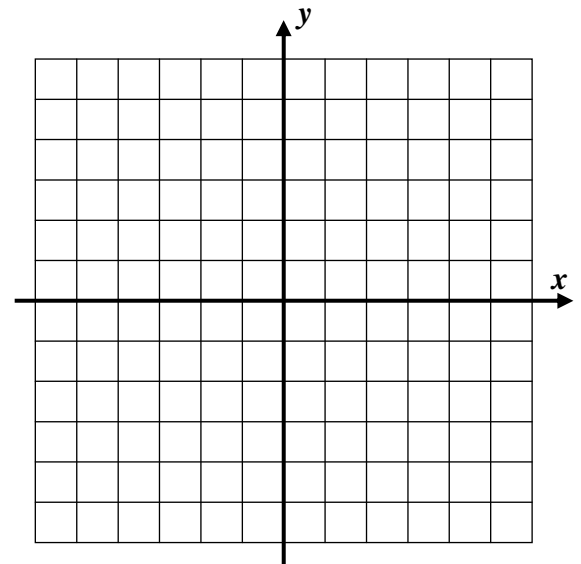
$$f(5) = \qquad f(-2) =$$

(b) Carefully evaluate $f(1)$.

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



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

