Name: ________________________________ Date: ______________

PIECEWISE FUNCTIONS…AND MORE PRACTICE!

Sometimes the function's rule gets all sorts of funny and can include being **piecewise defined**. Piecewise functions are called piecewise because, well, they are in **pieces!** 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.

In the example below, you can see that there are two different functions we are encountering. One of them is

$f(x)=2x+6$ and this function only applies when x is less than zero.

The other is

$6-x$ and this function only applies when x is greater than or equal to zero.

$f(x)=2x+6$
$f(x)=6-x$

***Exercise* #1:** Consider the function given by the formula $f(x)=\begin{cases}2x+6 & x<0\\ 6-x & x\geq 0\end{cases}$

(a) Evaluate each of the following:

Take note which of the above two functions you will be plugging your missing value into.

$f(4)=$ $6-x$, $6-4=2$

$f(-3)=$ $2x+6$, $2(-3)+6$, $-6+6=0$

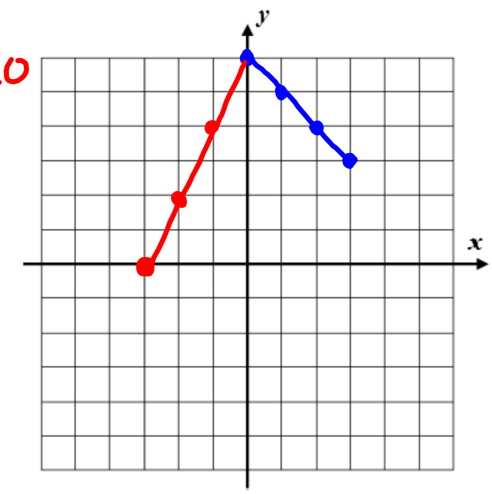
(b) Fill out the table below for the inputs given. Keep in mind which formula you are using.

$x<0$ * use $2x+6$

$x\geq 0$ * use $6-x$

x	Rule/Calculation	(x, y)
−3	$2(-3)+6=0$	$(-3,0)$
−2	$2(-2)+6=2$	$(-2,2)$
−1	$2(-1)+6=4$	$(-1,4)$
0	$6-(0)=6$	$(0,6)$
1	$6-(1)=5$	$(1,5)$
2	$6-(2)=4$	$(2,4)$
3	$6-(3)=3$	$(3,3)$

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



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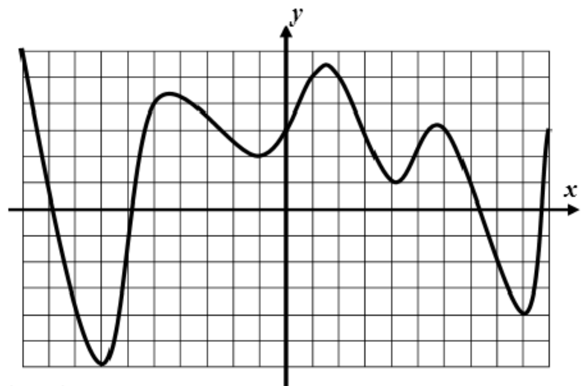
GRAPHS OF FUNCTIONS – PRACTICE (FINISH UP FOR HW).

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 (where does the graph cross over the y-axis)?

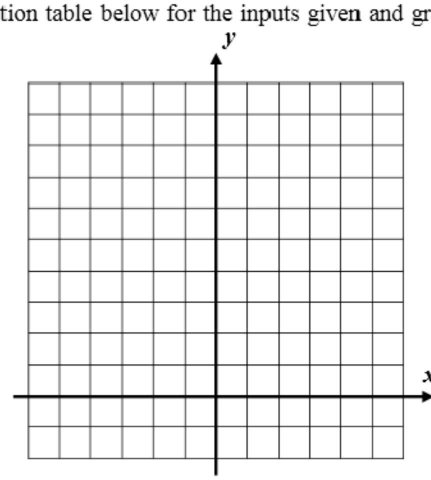
(d) State the maximum and minimum values the graph obtains.

Minimum: y = Maximum: y =

(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		



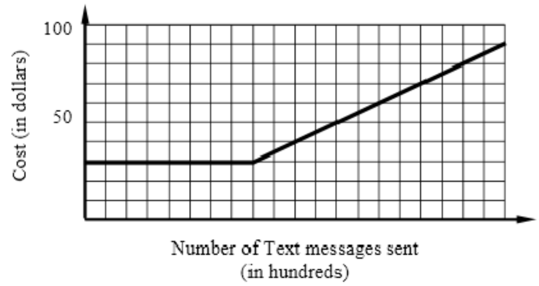
3. The following graph represents the cost of a phone plan after a certain number of text messages used in a month. Analyze the graph to answer the following questions.

(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?

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

(a) Evaluate each of the following:

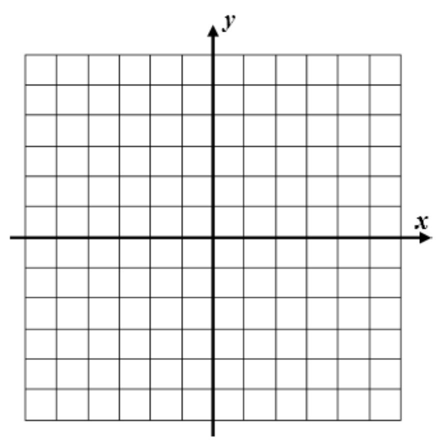
$f(5) =$ $f(-2) =$

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

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

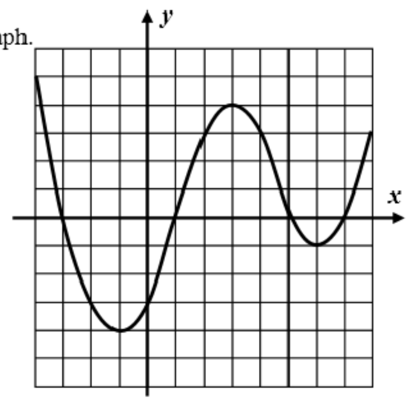
x	Rule/Calculation	(x, y)
-1		
0		
1		
2		
3		

(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.

5. Based on the graph of the function $y = g(x)$ shown below, answer the following questions.



(a) Evaluate each of the following. Illustrate with a point on the graph.

$g(-2) =$ $g(0) =$

$g(3) =$ $g(7) =$

(b) What values of x solve the equation $g(x) = 0$? These are called the **zeroes of the function (which happen to be where the graph crosses over the x-axis).**

(c) How many values of x solve the equation $g(x) = 2$? Remember, the output is a **y-coordinate.** How can you illustrate your answer on the graph? Remember, we are not looking for the exact x-values, only **how many solutions**.

There are ______ solutions.