

Name: \_\_\_\_\_  
Date: \_\_\_\_\_

Math 620 B Block  
Functions Unit Big Quiz Review

Determine whether the following are functions or not and explain your reasoning.

1.

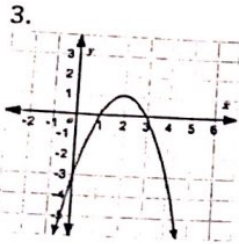
X	1	3	4	6	7
Y	3	5	-2	5	7

Yes  
each input has  
one output

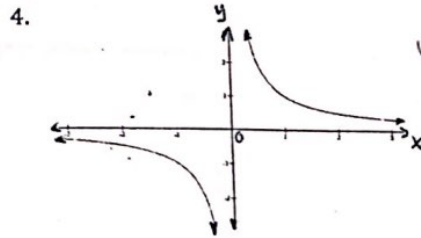
2.

X	1	-2	5	3	5
y	12	15	16	19	23

NO  
x=5 has two  
outputs



Yes,  
passes VLT



Yes,  
passes VLT

5. Evaluate the following

$k(x) = 2x - 4$	$m(x) = -x + 3$	$k(m(x)) = -2x + 2$
$k(x)$	$m(x)$	$k(m(x))$
$k(-1) = 2(-1) - 4$	$m(-1) = -(-1) + 3$	$k(m(-1)) =$
-6	4	$k(4) = 4$
$k(0) = 2(0) - 4$	$m(0) = -(0) + 3$	$k(m(0)) =$
-4	3	$k(3) = 2$
$k(1) = 2(1) - 4$	$m(1) = -(1) + 3$	$k(m(1)) =$
-2	2	$k(2) = 0$
$k(2) = 2(2) - 4$	$m(2) = -(2) + 3$	$k(m(2)) =$
0	1	$k(1) = -2$
$k(3) = 2(3) - 4$	$m(3) = -(3) + 3$	$k(m(3)) =$
2	0	$k(0) = -4$
$k(4) = 2(4) - 4$		
4		

6. Use the following functions to evaluate the question below  
 $f(x) = -3x - 4$   $g(x) = 2x - 1$  and  $h(x) = x^2 + 1$

a.  $f(-3) =$   
 $= -3(-3) - 4$   
 $= 5$

d.  $h(-4) = (-4)^2 + 1$   
 $= 16 + 1$   
 $= 17$

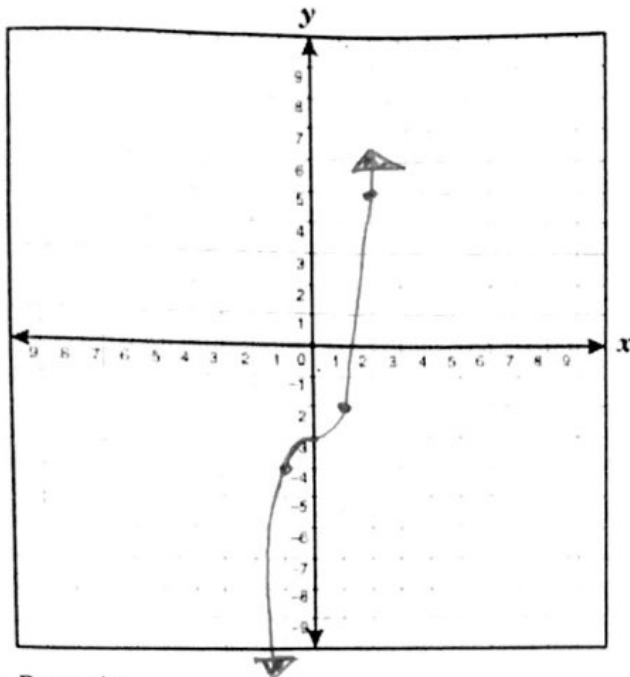
b.  $f(h(2)) =$   
 $h(2) = (2)^2 + 1 = 5$   
 $f(h(2)) = f(5) = -3(5) - 4 = -19$

e.  $g(h(-1)) =$   
 $h(-1) = (-1)^2 + 1$   
 $= 2$   
 $g(h(-1)) = g(2) = 2(2) - 1 = 3$

c.  $f(g(0)) =$   
 $g(0) = -1$   
 $f(g(0)) = f(-1) = -3(-1) - 4 = -1$

f.  $g(g(3)) =$   
 $g(3) = 2(3) - 1$   
 $= 5$   
 $g(g(3)) = g(5) = 9$

Graphing equations



7.  $y = x^3 - 3$  Predict the shape:

*cubic*

a. Complete the table

X	-2	-1	0	1	2
Y	-11	-4	-3	-2	5

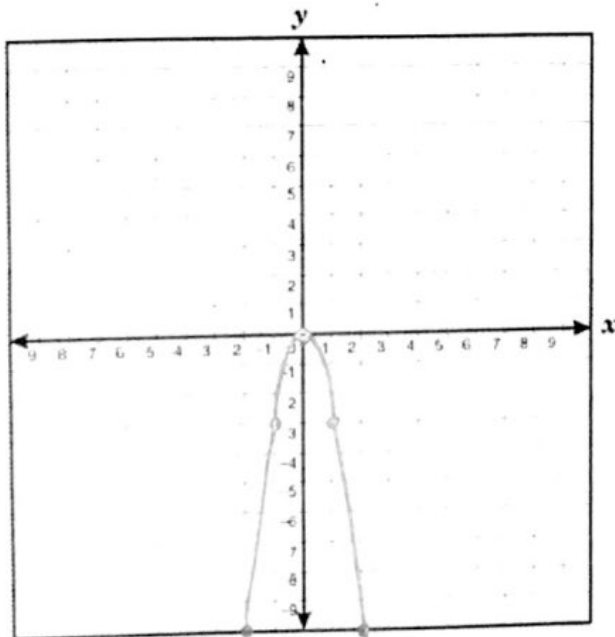
b. Use your table to help graph the function. Remember there are no restrictions so your graph should have arrows!

c. Domain:

$x = \text{all real } \#$

d. Range:

$y = \text{all real } \#$



8.  $y = -2x^2 + x$  Predict the shape:

*Parabola*

a. Complete the table:

X	-2	-1	0	1	2
Y	-10	-3	0	-3	-10

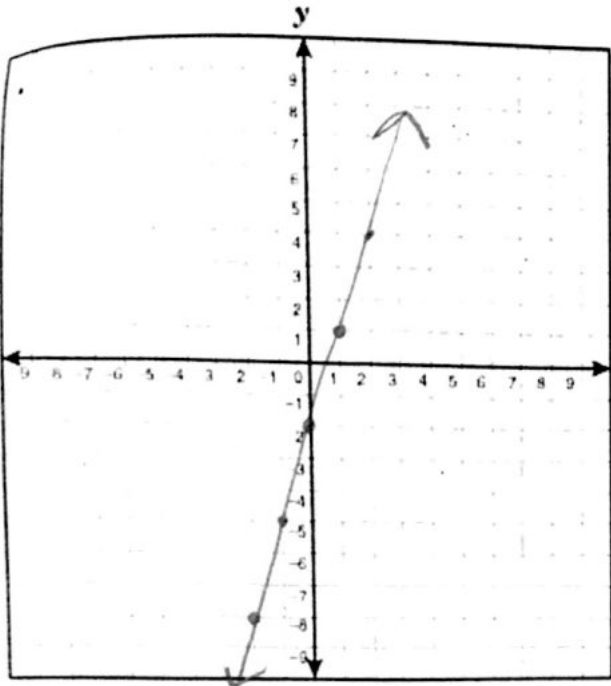
b. Use the table to graph the function.

c. Domain:

$x = \text{all real } \#s$

d. Range:

$y \leq 0$



9.  $y = 3x - 2$  Predict the shape: *Linear*

a. Now you pick 5 values for  $x$  and solve for  $y$

X	-2	-1	0	1	2
Y	-8	-5	-2	1	4

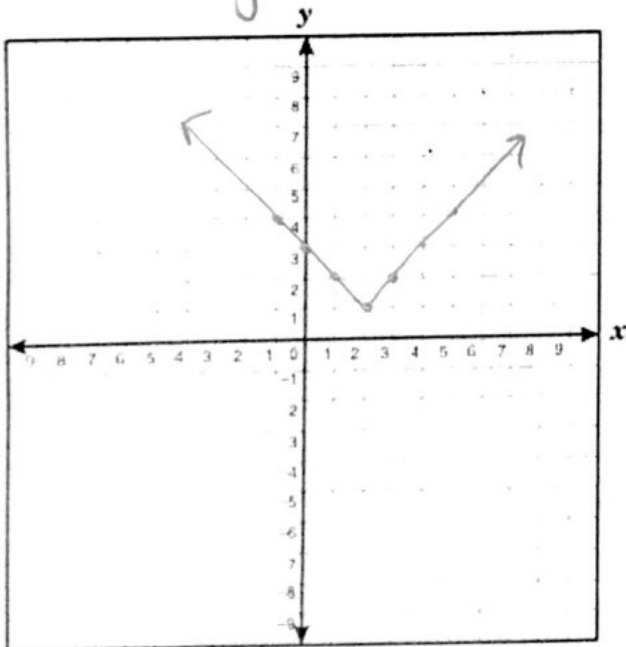
b. Use the table to graph the function

c. Domain:

$x = \text{all real } \#$

d. Range:

$y = \text{all real } \#$



10.  $y = |x - 2| + 1$  Predict the shape: *V-shaped*

a. Complete the table

X	-1	0	1	2	3	4
Y	4	3	2	1	2	3

b. Use the table to graph the function

c. Domain:

$x = \text{all real } \#$

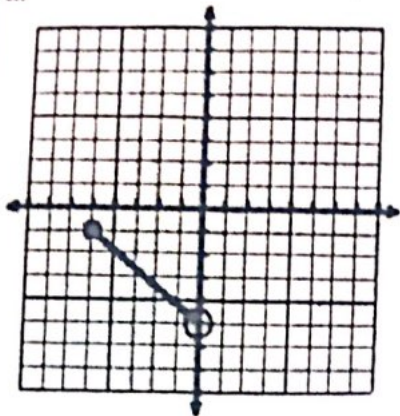
d. Range:

$y \geq 1$



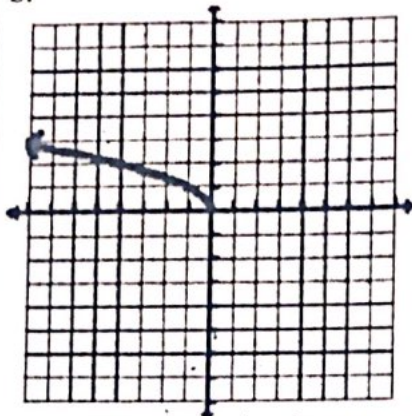
5. Determine the domain (x values) and range (y values) for each given drawing.

a.



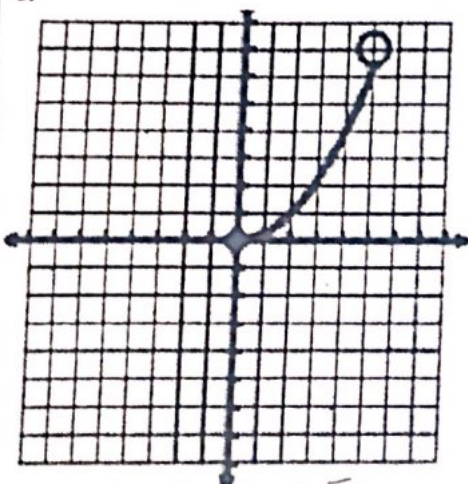
Domain:  $-5 \leq x < 0$   
 Range:  $-5 < y < -1$

b.



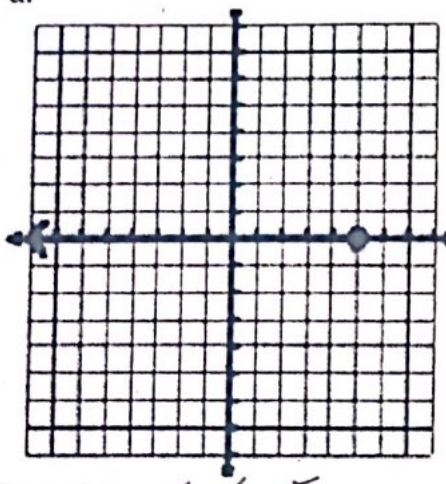
Domain:  $x \leq 0$   
 Range:  $y \geq 0$

c.



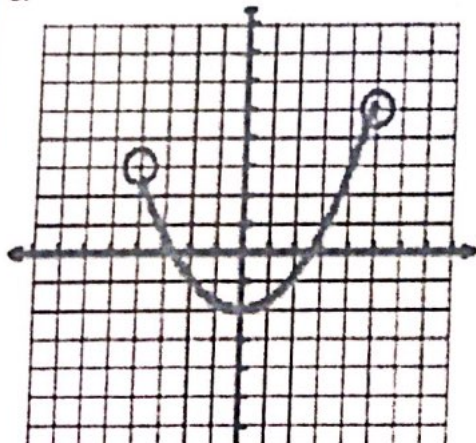
Domain:  $0 \leq x < 5$   
 Range:  $0 \leq y < 7$

d.



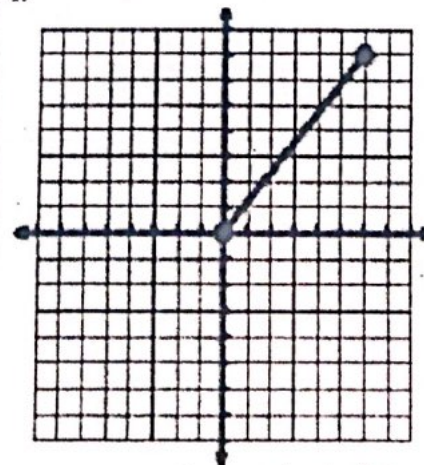
Domain:  $x \leq 5$   
 Range:  $y = 0$

e.



Domain:  $-4 < x < 5$   
 Range:  $-2 \leq y < 5$

f.



Domain:  $0 < x \leq 6$   
 Range:  $0 \leq y \leq 7$

Name \_\_\_\_\_

### Function Word Problems

For the following function:

1. Create a table of values and determine the **shape** of the graph.
2. Graph the function.
3. Determine the domain of the function.
4. Determine the range of the function.

A.  $f(x) = |x - 3| - 2$

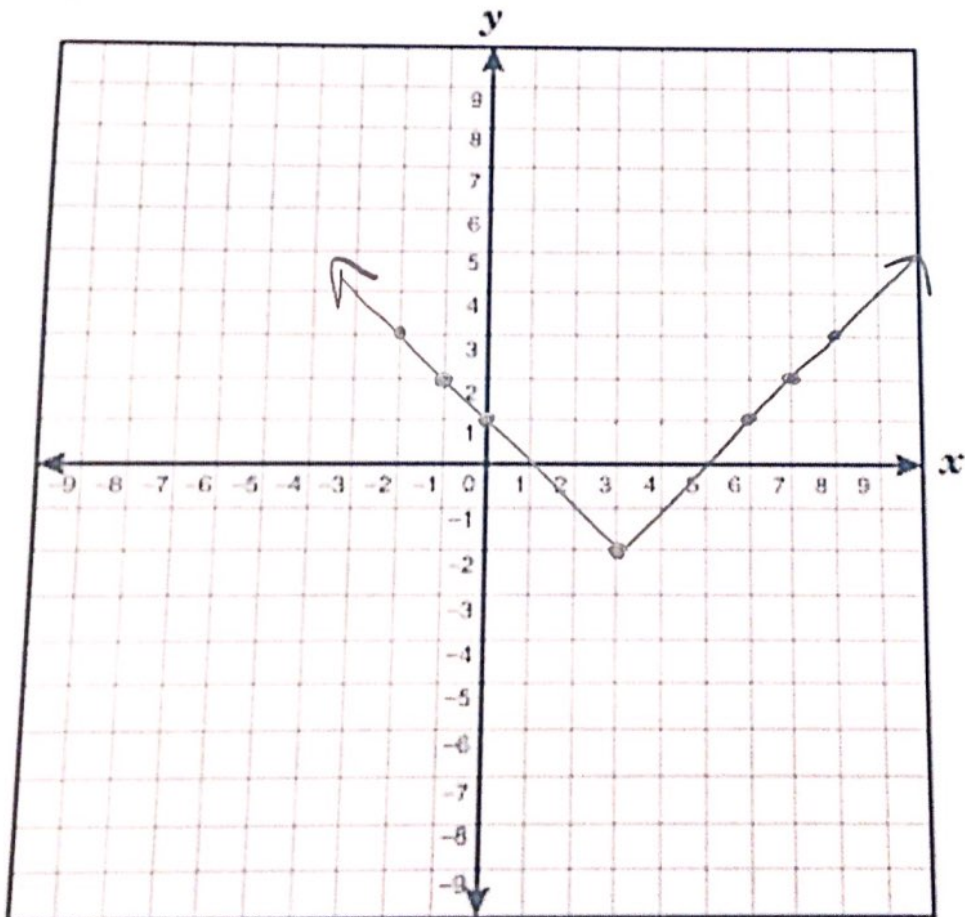
Shape:



1.

X	f(x)
-1	2
0	1
3	-2
8	3
15	10

2.



3. Domain:

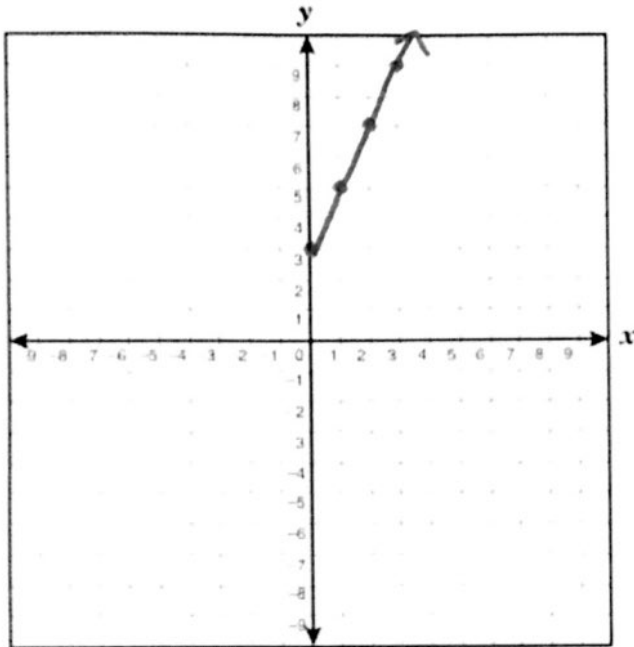
$$x = \text{all real } \neq$$

4. Range:

$$y \geq -2$$

WORD PROBLEMS – write an equation to represent the word problem, then graph your equation and answer the question.

1. Marla has been measuring the length of her baby's hair. The first time it was 3 inches long and after a month it was 2 inches longer. If we assume her hair will continue to grow at this rate create an equation for the length of the baby's hair.



a) **Define variables:**

Let  $x$  represent  $\rightarrow$  months

Let  $f(x)$  represent  $\rightarrow$  length baby's hair

b) **Equation:**

Remember! Start with the general equation  $f(x) = mx + b$  where  $m = \text{slope}$  or **rate of change** and  $b = \text{the y-intercept}$  or **starting point**

i. What is the rate of the baby's hair growth?

$$m = 2 \text{ in / month}$$

Substitute your value for  $m$  in  $f(x) = mx + b$ , and write your new equation below.

$$f(x) = 2x + b$$

ii. Next find the starting point ( $b$ ). When Marla first started measuring her baby's hair, how long was it?

$$b = 3 \text{ inches}$$

Substitute your values for  $m$  and  $b$  in the equation  $f(x) = mx + b$  and write your new equation below.

$$f(x) = 2x + 3$$

c) **Graph it!**

i. What is the graph's shape?

Linear

Domain:

$$x \geq 0 \text{ months}$$

Range:

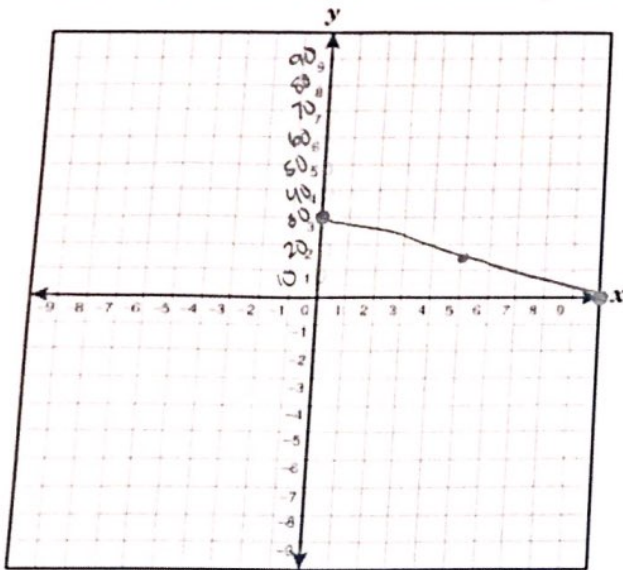
$$y \geq 3 \text{ inches}$$

d) How long is Marla's baby's hair after 6 months?

$$f(6) = 2(6) + 3 = 12 + 3 = 15 \text{ inches}$$



2. Tyler empties a water tank at the rate of 3 liters per minute. If the tank originally had 30 liters of water write an equation for the amount of water left in the tank versus time and graph it. (remember you can't have negative water so think about maximum values)



a) Define variables:

$x \rightarrow$  time in minutes  
 $f(x) \rightarrow$  liters of water in tank

b) Equation:

$$f(x) = mx + b$$

$$m = -3 \text{ L/min}$$

$$b = 30 \text{ L}$$

$$f(x) = -3x + 30$$

c) Graph it!

d) Domain:

$$0 \leq x \leq 10$$

Range:

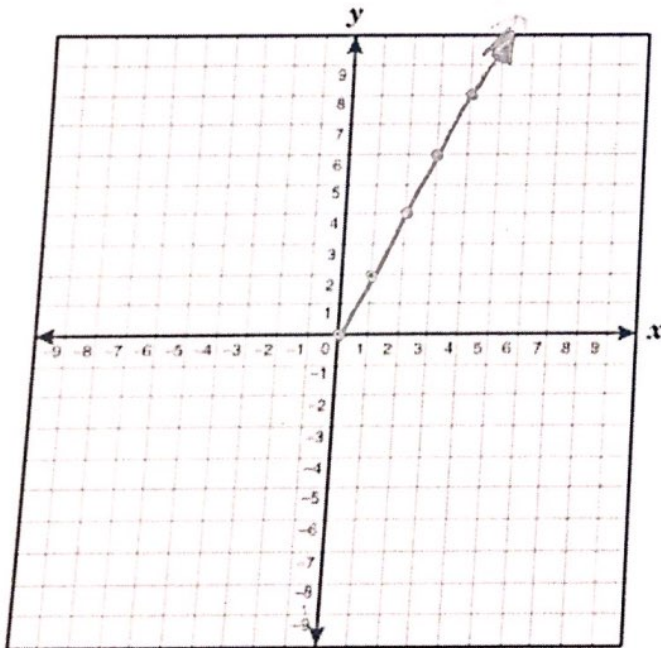
$$0 \leq y \leq 30$$

e) How long will it take for the water tank to be empty?

$$0 = -3x + 30$$

$$x = 10 \text{ minutes} \rightarrow 10 \text{ minutes}$$

3. Lou fills water bottles at a rate of 2 bottles every minute. Create an equation for the number of bottles of water Lou has filled as a function of time.



a) Define variables:

$x \rightarrow$  time in minutes  
 $f(x) \rightarrow$  # water bottles filled

b) Equation:

$$f(x) = mx + b$$

$$m = 2 \text{ bottles/min}$$

$$b = 0$$

$$f(x) = 2x + 0$$

c) Graph it!

d) Domain:

$$x \geq 0$$

Range:

$$y \geq 0$$

e) How long will it take Lou to fill 100 water bottles?

$$\frac{100}{2} = \frac{2x}{2}$$

$$x = 50 \text{ minutes}$$