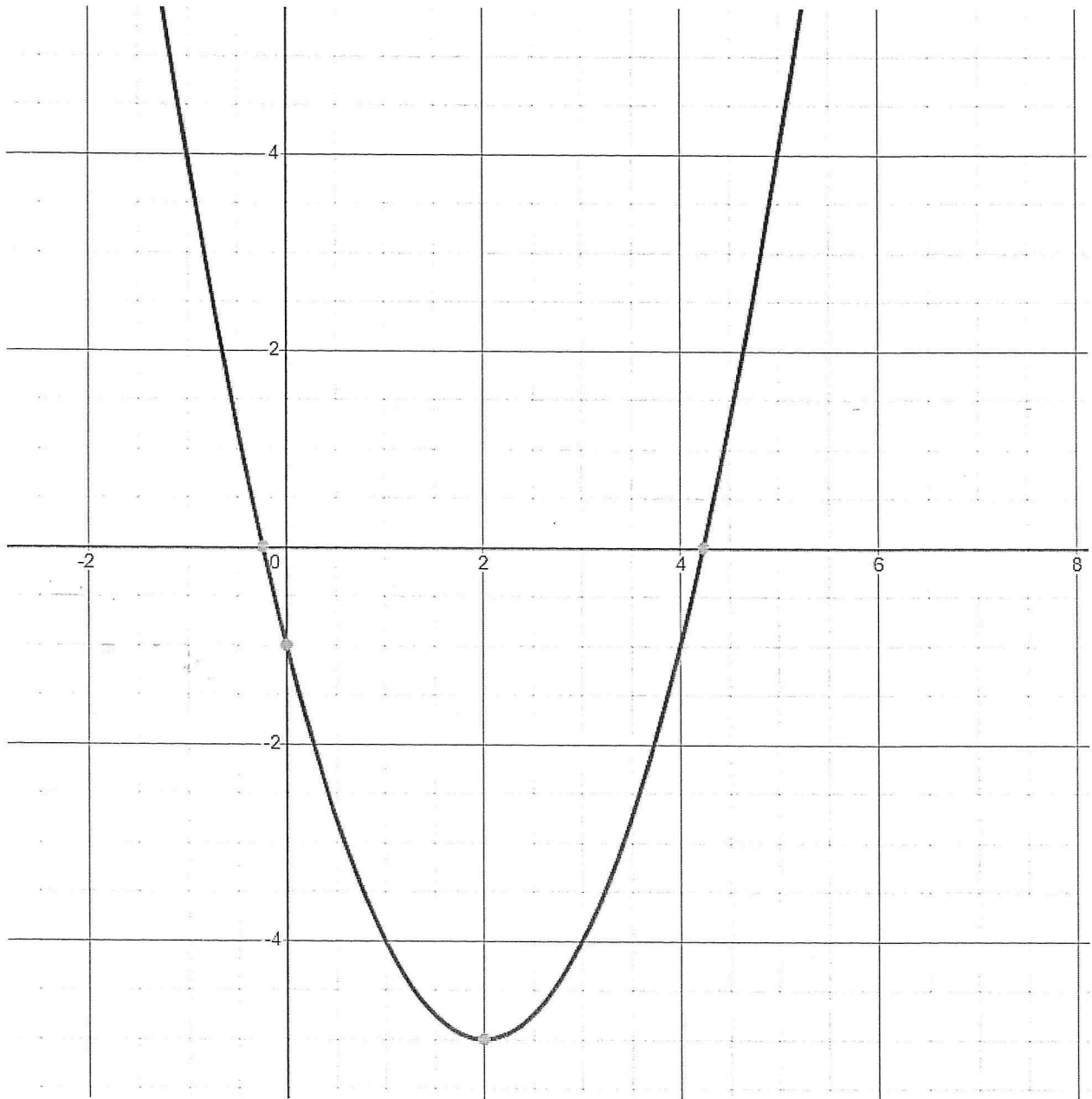


Assignment #20 Review #1

Write the equation of the following functions. Notice they are all in vertex form. Also the leading coefficient is 1. So these should be extremely easy to write.



Equation

$$(x - 2)^2 - 5$$

Domain

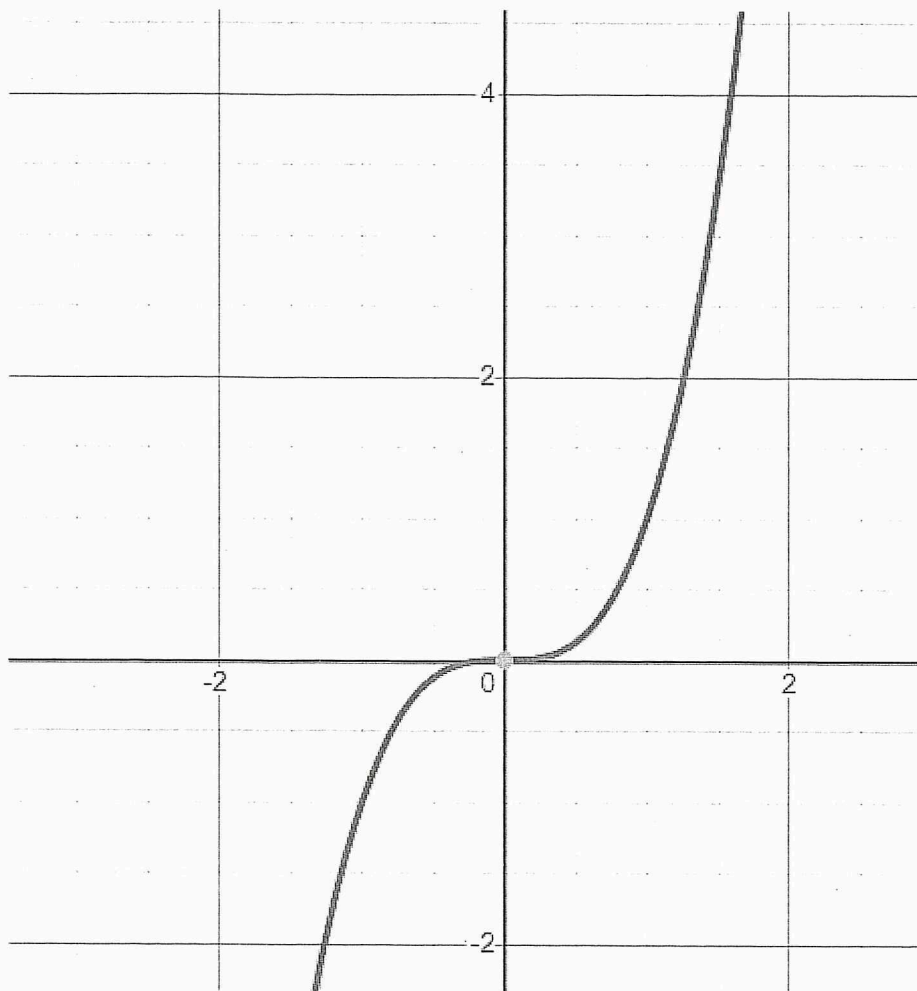
All Real #'s

Range

$$y \geq -5$$

When is  $f(x)$  increasing?

when  $x > 2$



Equation

$$y = x^3$$

Domain

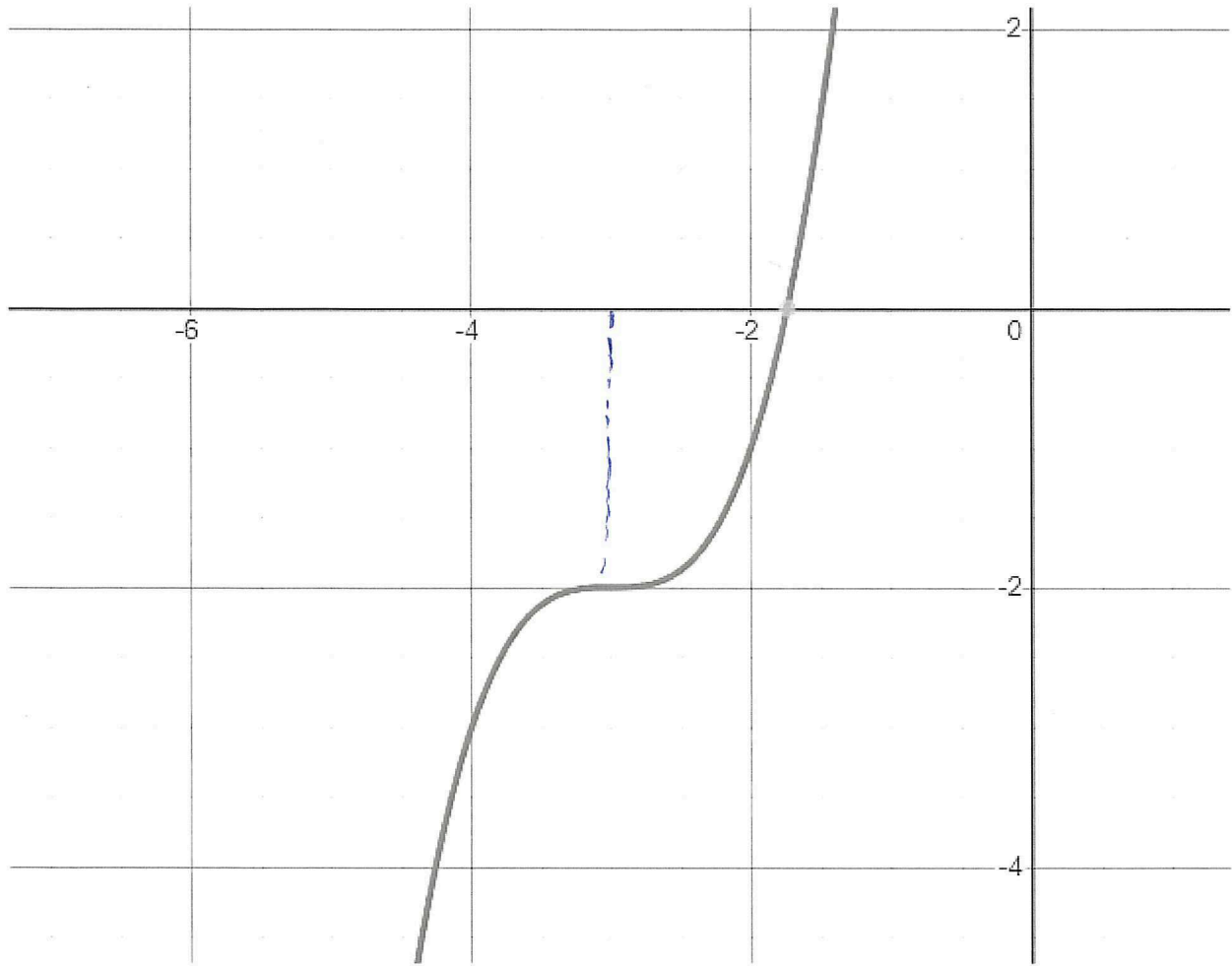
All Real

Range

All Real

What is true about the rate of change when  $0 < x < 40$ ?

Increasing at an Increasing Rate



Equation

$$(x+3)^3 - 2$$

Domain

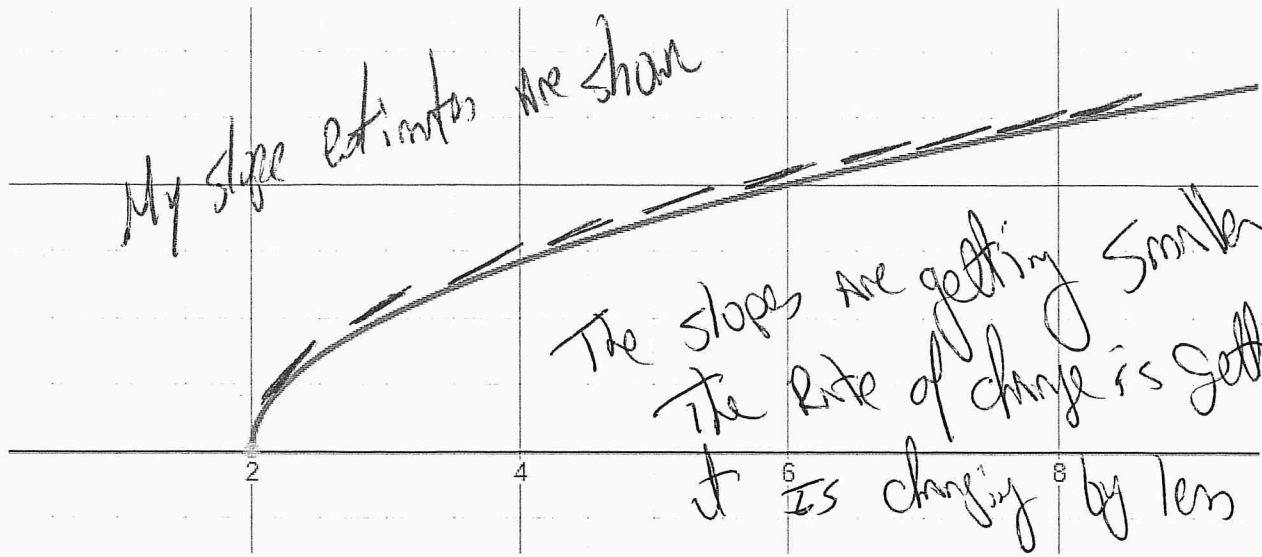
All Real #'s

Range

All Real #'s

What is true about the rate of change from  $-25 < x < -3$

Decreasing at a decreasing rate  
The slopes are getting smaller  
and smaller as they approach  
the vertex



Equation

$$y = (x-2)^{\frac{1}{2}}$$

Domain

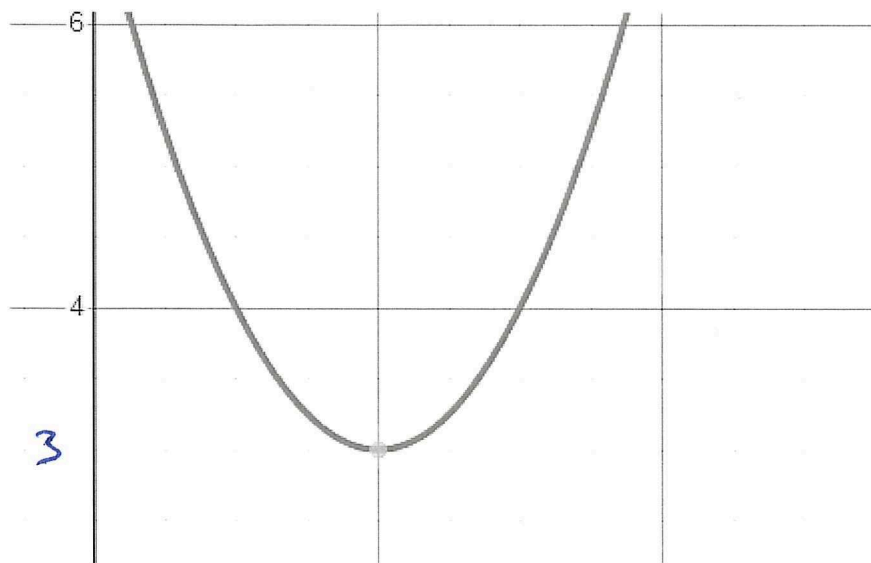
$$x \geq 2$$

Range

$$y \geq 0$$

What is true about the rate of change when  $2 < x < 12$

~~decreasing~~  
 Rate at an ~~decreasing~~ decreasing rate



Equation

$$y = (x-4)^2 + 3$$

Domain:

All Real

Range:

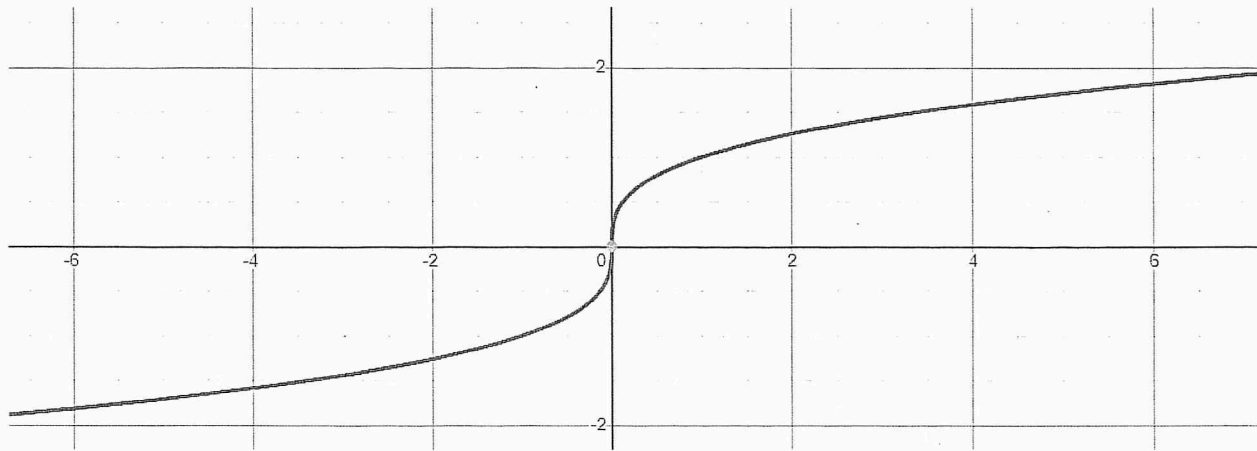
$$y \geq 3$$

Rate of change  $2 < x < \infty$   
 Increasing at an increasing  
 rate

Rate of change from  $-\infty < x < 2$

Decreasing at decreasing rate

At 2 slope is 0



Equation

$$y = x^{\frac{1}{2}}$$

Domain

All Real

Range:

All Real

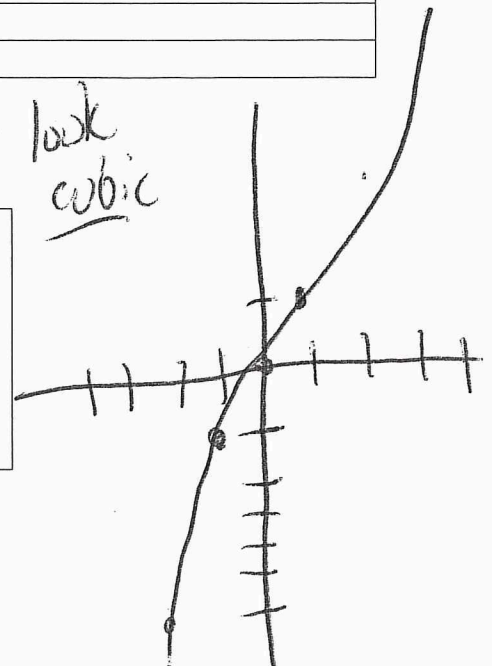
7) A person collected data on the time it took to do a task. What family of functions does this most closely model. **A good strategy would be to roughly graph the points and see what it is looking like.**

x	y
-2	-7
-1	-1
0	0
1	1
2	7
3	25

points look cubic

What family of functions does it model?

$$y = x^3$$



8) Another person gathered data on the time it took to do a task. This is the table that they found:

x	y
0	0
1	1
2	1.3
3	1.65
4	1.89

Family of functions that this most closely resembles.

$$y = \sqrt{x}$$

9) Given  $f(x) = 2x - 4$  and  $g(x) = x^2$

What is  $f(g(x))$  and What is  $g(f(x))$ ?

Final answer for  $f(g(x))$

$$2x^2 - 4$$

$$f(x^2) \quad 2x^2 - 4$$

Final answer for  $g(f(x))$

$$(2x - 4)^2$$

$$g(2x - 4)$$



10) You have a 12 by 18 inch piece of paper. You will be constructing an open top box.

1) What is the equation for this scenario?

$$y = x(12 - 2x)(18 - 2x)$$

2) What family of functions does this belong to?

Cubic  $x \cdot x \cdot x = x^3$

3) What are the x intercepts for this function?

0 6 9

4) Sketch the graph

5) What is the real life domain for this problem?

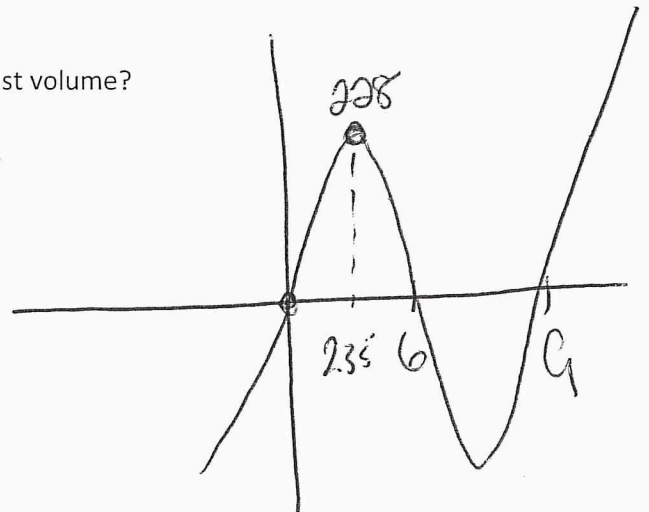
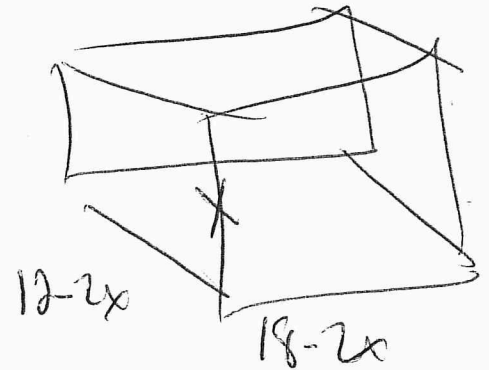
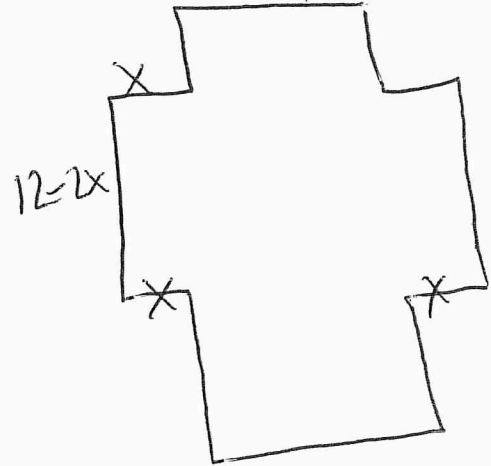
$0 < x < 6$

6) What is the maximum volume?

228.16 in<sup>3</sup>

7) What are the dimensions of the box that create the most volume?

2.35 by 7.3 by 13.3





11) If  $f(x) = -3x^2 - 8$ , then what is  $f(-12)$ ?

$$-3(-12)^2 - 8$$
$$\underline{-440}$$

12) If  $f(x) = -3x^2 - 8$ , then what is  $x$  when  $f(x) = -56$ ?

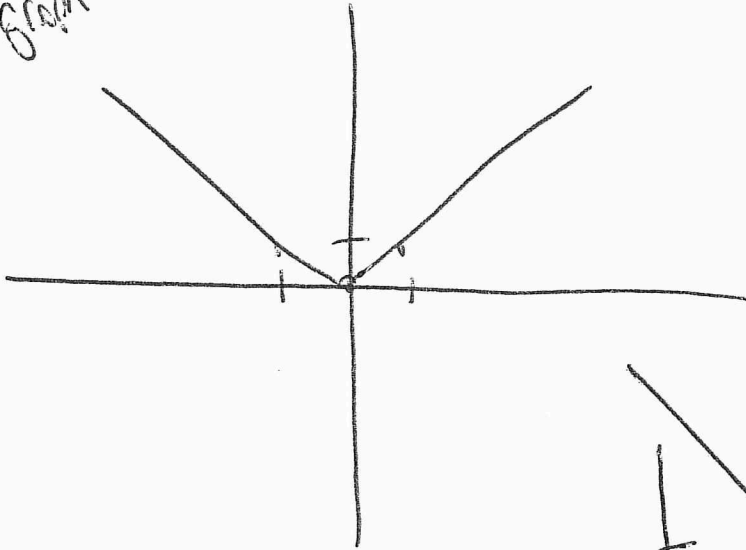
$$-56 = -3x^2 - 8$$
$$16 = x^2$$
$$\underline{x = \pm 4}$$

13) Describe what happens to  $f(x)$  if the transformation is  $y = f(x+7) + 3$

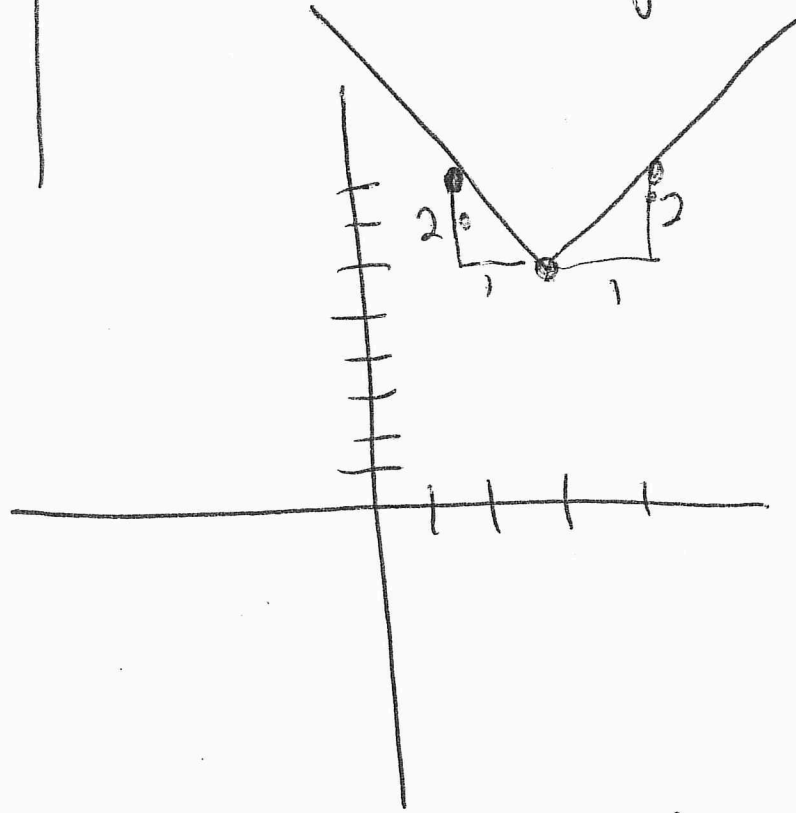
Left 7 units  
Up 3 units

14) Describe the transformation to  $y = 2|x - 3| + 6$

Parent graph



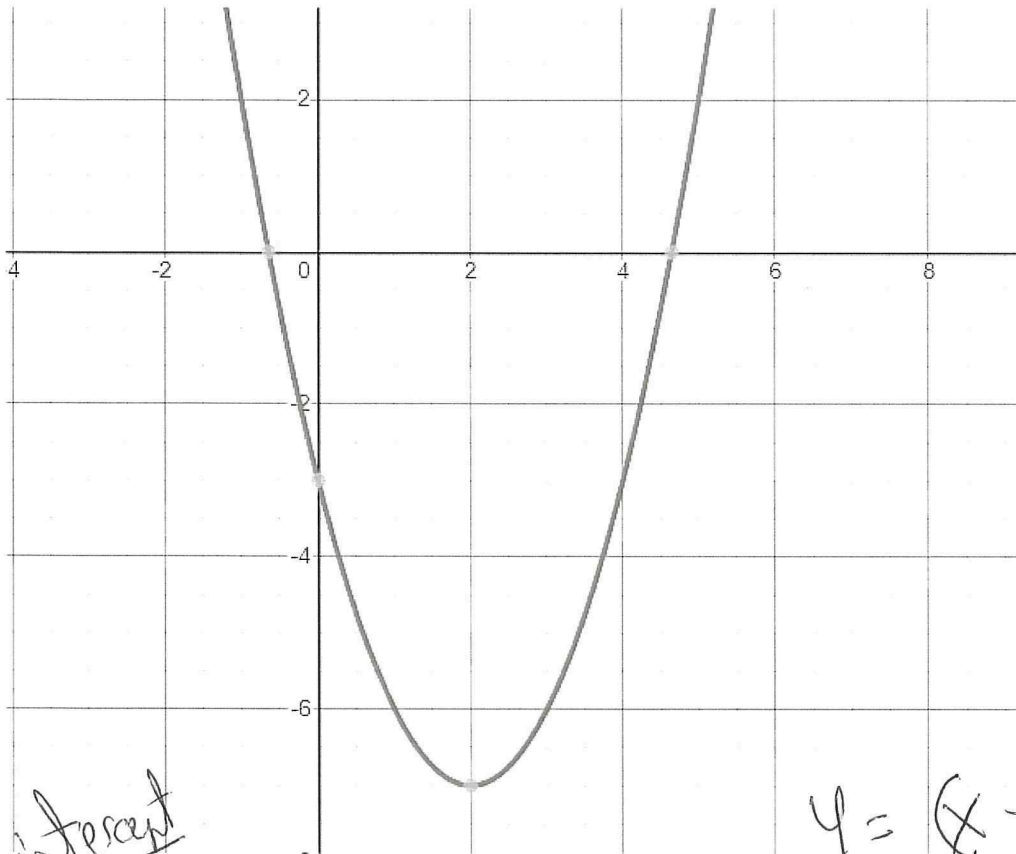
new graph



Description

The new graph is moved right 3  
up 6  
And has a 2-1 relationship from  
vertex

15)



x intercept

$$(x-2)^2 - 7 = 0$$

$$x = 2 \pm \sqrt{7}$$

$$y = (x-2)^2 - 7$$

y- intercept	X intercepts	Max or min where?	Domain	Range
$(0, -3)$	4.64  -1.65	Min At $(2, -7)$	All Real	$y \geq -7$
For what x values is f(x) increasing?  when $x > 2$		For what x values is f(x) decreasing?  $-\infty < x < 2$		