Day 5-MCR3U

Name:____

Date:____

1.6: Exploring Transformations of Parent Functions

Invariant Point: point that is unaltered by a transformation.

Part 1: Exploring Vertical Translations: y = f(x) + c

A) Quadratic Function: $y = x^2$

Complete the following tables of values and use them to graph and label each function.

x	$y = x^2$
-2	4
-1	1
0	0
1	1
2	4

(a)

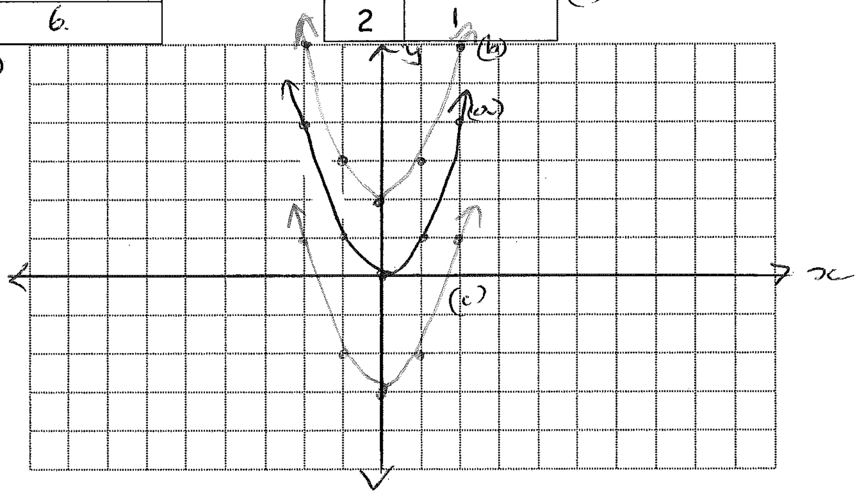
x	$y = x^2 + 2$
-2	6
-1	3
0	2
1	3
2	6

(b)

x	$y = x^2 - 3$
-2	1
-1	-2
0	-3
1	-2
2	1

(c)

Compare each function to the first function, $y = x^2$. Notice the similarities and differences of the coordinates of the points.



B) Square Root Function: $y = \sqrt{x}$

Complete the following tables of values and use them to graph and label each function.

x	$y = \sqrt{x}$
0	0
1	1
4	2
9	3
16	4

(a)

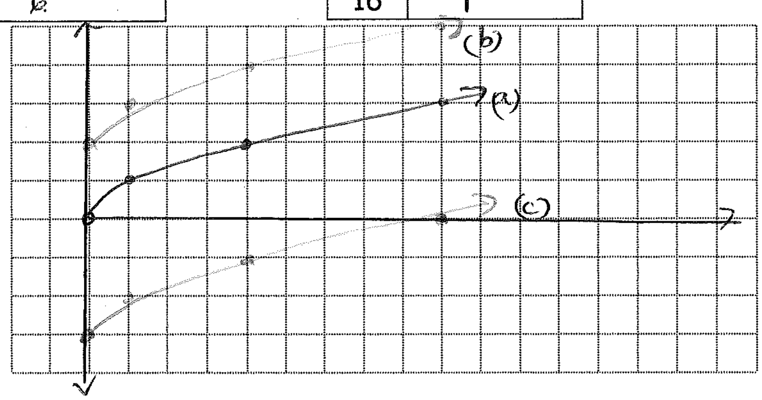
x	$y = \sqrt{x} + 2$
0	2
1	3
4	4
9	5
16	6

(b)

x	$y = \sqrt{x} - 3$
0	-3
1	-2
4	-1
9	0
16	1

(c)

Compare each function to the first function, $y = \sqrt{x}$. Notice the similarities and differences of the coordinates of the points.



Day 5-MCR3U

Name:______________________________

Date:______________________________

C) Reciprocal Function: $y = \frac{1}{x}$

Complete the following tables of values and use them to graph and label each function.

x	$y = \frac{1}{x}$
-4	-1/4
-1	-1
$-\frac{1}{4}$	-4
$\frac{1}{4}$	4
1	1
4	1/4

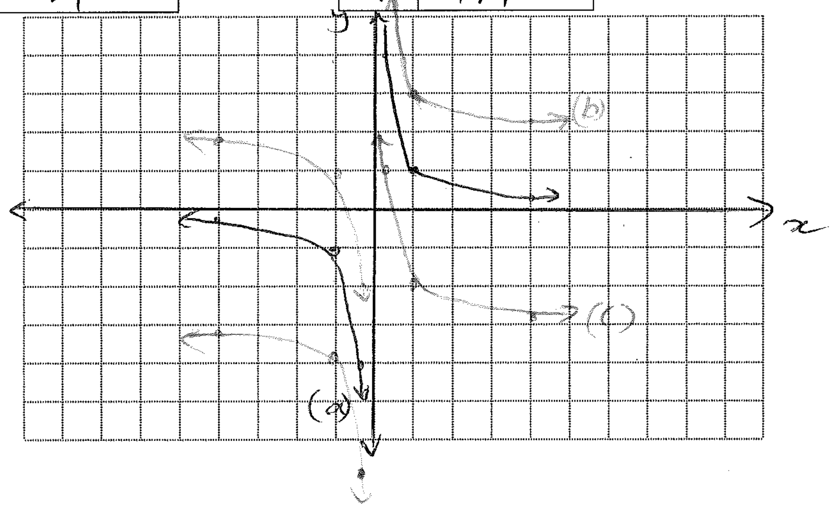
a)

x	$y = \frac{1}{x} + 2$
-4	7/4
-1	1
$-\frac{1}{4}$	-2
$\frac{1}{4}$	6
1	3
4	9/4

b)

x	$y = \frac{1}{x} - 3$
-4	-13/4
-1	-4
$-\frac{1}{4}$	-7
$\frac{1}{4}$	1
1	-2
4	-11/4

c)



Compare each function to the first function, $y = \frac{1}{x}$. Notice the similarities and differences of the coordinates of the points.

(b) translate 2 units up.
horizontal asymptote $y=2$

(c) translate 3 units down
horizontal asymptote $y=-3$

SUMMARY

If y = f(x) is transformed to y = f(x) + c, where c is a number, describe the transformation:

1. If c > 0, then translate 'c' units upward.
2. If c < 0, then translate 'c' units downward.
3. Any point (x, y) under this transformation becomes (x , y+c).

"outside" affects 'y'.

Day 5-MCR3U

Name:

Date:

Part 2: Exploring Horizontal Translations: y = f(x – d)

A) Quadratic Function: $y = x^2$

Complete the following tables of values and use them to graph and label each function.

x	$y = x^2$
-2	4
-1	1
0	0
1	1
2	4

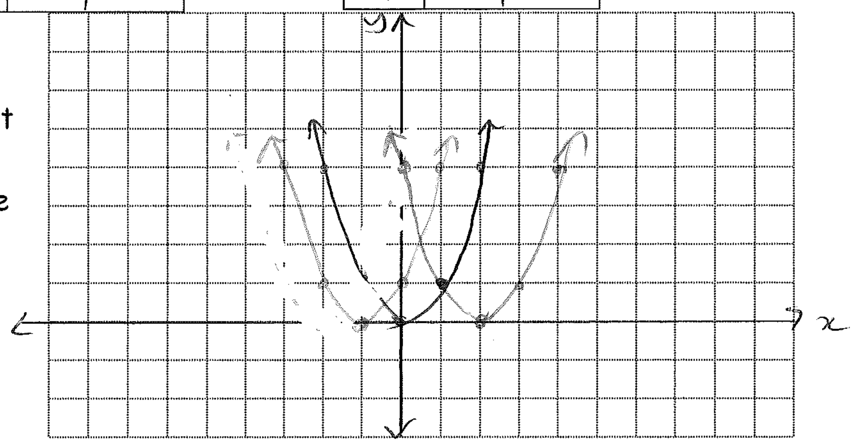
(a)

x	$y = (x+1)^2$
-3	4
-2	1
-1	0
0	1
1	4

(b)

x	$y = (x-2)^2$
0	4
1	1
2	0
3	1
4	4

(c)



Compare each function to the first function, $y = x^2$. Notice the similarities and differences of the coordinates of the points.

(b) translate 1 unit left from $y=x^2$ graph

(c) translate 2 units right from $y=x^2$ graph

B) Square Root Function: $y = \sqrt{x}$

Complete the following tables of values and use them to graph and label each function.

x	$y = \sqrt{x}$
0	0
1	1
4	2
9	3
16	4

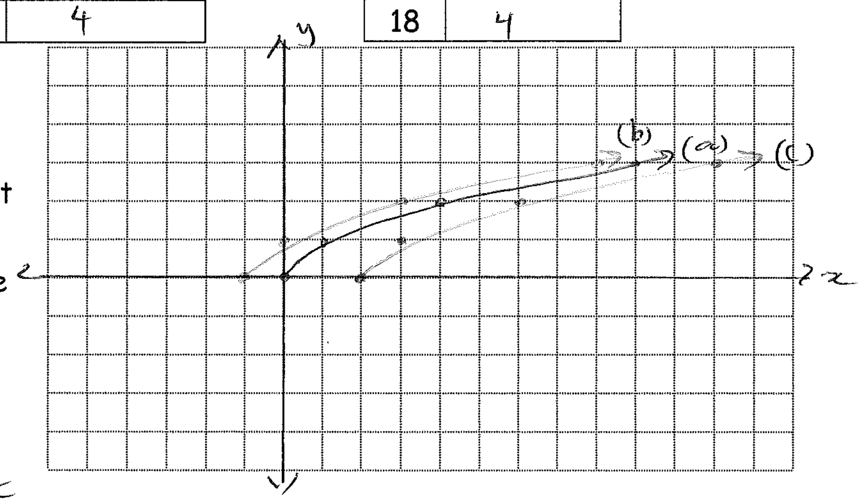
(a)

x	$y = \sqrt{x+1}$
-1	0
0	1
3	2
8	3
15	4

(b)

x	$y = \sqrt{x-2}$
2	0
3	1
6	2
11	3
18	4

(c)



Compare each function to the first function, $y = \sqrt{x}$. Notice the similarities and differences of the coordinates of the points.

(b) translate 1 unit left from $y=\sqrt{x}$ graph.

(c) translate 2 units right from $y=\sqrt{x}$ graph.

Day 5-MCR3U

Name:________________________
Date:________________________

C) Reciprocal Function: $y = \frac{1}{x}$

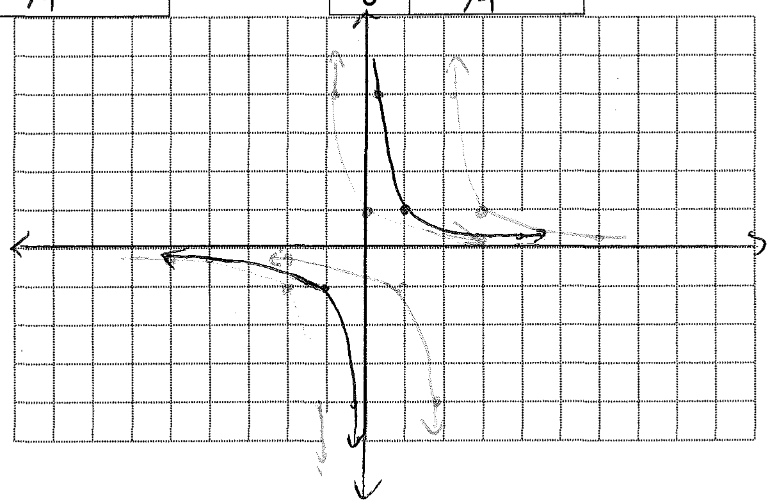
Complete the following tables of values and use them to graph and label each function.

x	$y = \frac{1}{x}$
-4	$-\frac{1}{4}$
-1	-1
$-\frac{1}{4}$	-4
$\frac{1}{4}$	4
1	1
4	1/4

x	$y = \frac{1}{x+1}$ ~
-5	-1/4
-2	-1
$-\frac{5}{4}$	-4
$-\frac{3}{4}$	4
0	1
3	1/4

x	$y = \frac{1}{x-2}$ ~
-2	-1/4
1	-1
$\frac{7}{4}$	-4
$\frac{9}{4}$	4
3	1
6	1/4

translate 2 units to the right.



Compare each function to the first function, $y = \frac{1}{x}$. Notice the similarities and differences of the coordinates of the points.

(b) translate 1 unit left

(c) translate 2 units right

SUMMARY

If y = f(x) is transformed to y = f(x - d), where d is a number, describe the transformation:

1. If d > 0, then translate 'd' units to the right
2. If d < 0, then translate 'd' units to the left
3. Any point (x, y) under this transformation becomes (x+d, y).

"inside" affects 'x'