

# Inverse of Functions - Let's Look at the Graphs!

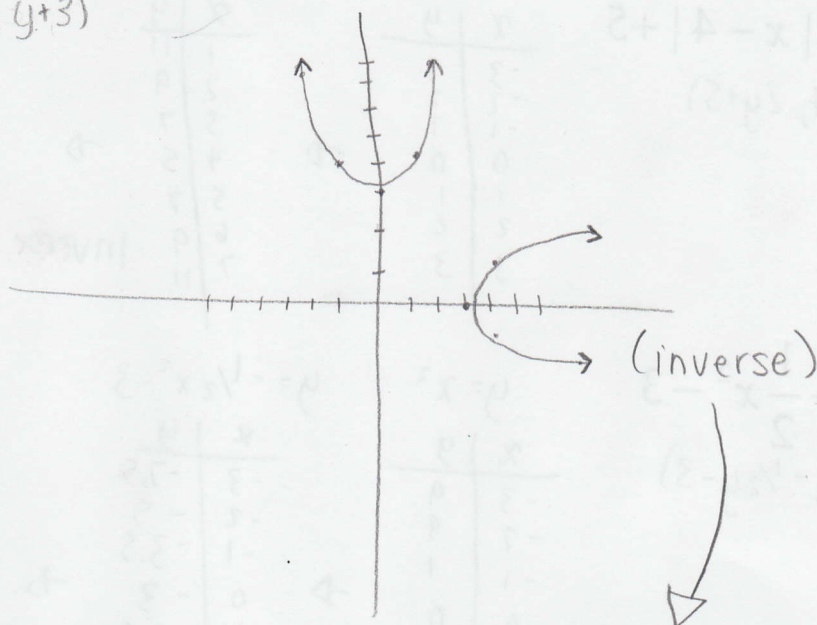
Graph the function  $y = x^2 + 3$  by determining the mapping notation and creating a table of values. State the domain and range of the function.

$y = x^2$

x	y
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9

$(x, y+3)$

x	y
-3	12
-2	7
-1	4
0	3
1	4
2	7
3	12



Graph a new function by "switching" the x values and y values from the function above. This is called the **INVERSE** of the function. How would you describe the inverse? What "transformation" has taken place? State the domain and range of the inverse of the function. What do you notice about the domain and range?

$y = x^2$

x	y
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9

$y = x^2 + 3$

x	y
-3	12
-2	7
-1	4
0	3
1	4
2	7
3	12

↻ Inverse ↻

x	y
12	-3
7	-2
4	-1
3	0
4	1
7	2
12	3

★ transformation  
 → the inverse graph is a reflection over the line  $y = x$

Conclusions:

### Question #1

Graph the Inverse of the following functions. State the domain and range of the inverse.

1)  $y = 2|x - 4| + 5$

$(x+4, 2y+5)$

$y = |x|$

x	y
-3	3
-2	2
-1	1
0	0
1	1
2	2
3	3

→

$y = 2|x - 4| + 5$

x	y
1	11
2	9
3	7
4	5
5	7
6	9
7	11

→

x	y
11	1
9	2
7	3
5	4
7	5
9	6
11	7

Inverse

2)  $y = -\frac{1}{2}x^2 - 3$

$(x, -\frac{1}{2}y - 3)$

$y = x^2$

x	y
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9

→

$y = -\frac{1}{2}x^2 - 3$

x	y
-3	-7.5
-2	-5
-1	-3.5
0	-3
1	-3.5
2	-5
3	-7.5

→

x	y
-7.5	-3
-5	-2
-3.5	-1
-3	0
-3.5	1
-5	2
-7.5	3

Inverse

### Question #2 ON TEST

A point (3,5) is on the function  $y = f(x)$ . Determine the coordinates of this point for the inverse of  $y = 3f(x-1) + 2$ .  $(x+1, 3y+2)$

x	y
3	5

→

x	y
4	17

→

x	y
17	4

Image      Inverse

, could be anything