Master E

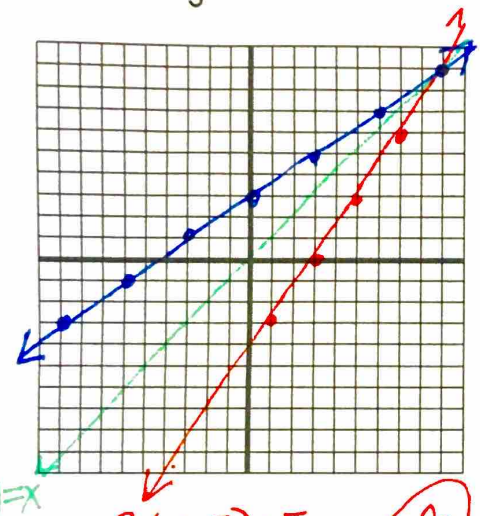
Day 02 Investigation: Graphing & Writing inverse equations of functions

1. Graph each function plotting as many "friendly points" that will fit on the graph. List these points in the table A.
2. Graph the inverse of each function… by taking your coordinates (x, y) from the original graph and switching them (y,x). List these points in table B. *(Plot these points on the same graph as the original using a different color.)*
3. Is the inverse of your graph a function or relation?

Day 03: Finish 4-6 in class

4. Can you find the line of symmetry in each problem? ☺ $y=x$
5. Can you write the equation of the inverse of each function? ☺
6. How each inverse equation related to the equation of the original function? ☺

I. $f(x) = \frac{2}{3}(x-3)+5$



A	
x	y
-3	1
0	3
3	5
6	7
9	9

B	
x	y
1	-3
3	0
5	3
7	6
9	9

Function

$y=x$

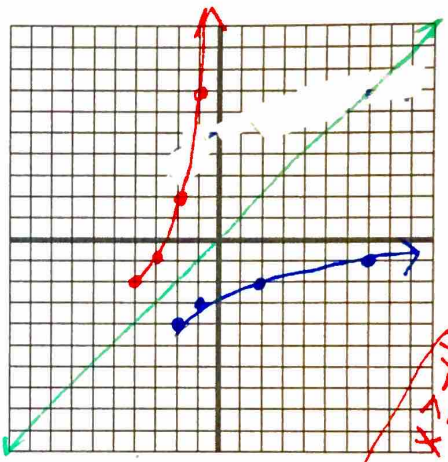
$x = \frac{2}{3}(y-3)+5$

$x-5 = \frac{2}{3}(y-3)$

$\frac{3}{2}(x-5) = y-3$

$f^{-1}(x) = \frac{3}{2}(x-5)+3$

II. $f(x) = \sqrt{x+2}-4$



A	
x	y
-2	-4
-1	-3
2	-2
7	-1

B	
x	y
-4	-2
-3	-1
-2	2
-1	7

Function

$y=x$

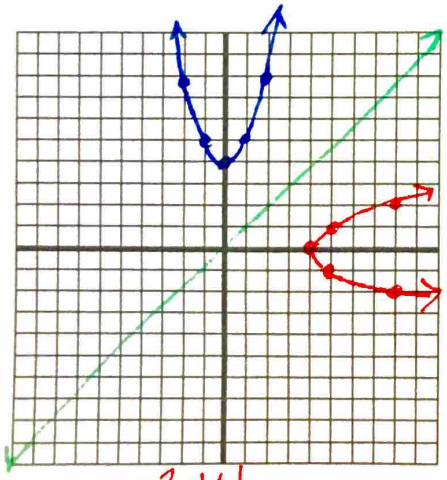
$x = \sqrt{y+2}-4$

$x+4 = \sqrt{y+2}$

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

$f^{-1}(x) = (x+4)^2 - 2$, $x \geq -4$

III. $f(x) = x^2+4$



A	
x	y
-2	8
-1	5
0	4
1	5
2	8

B	
x	y
8	-2
5	-1
4	0
5	1
8	2

Relation

$y=x$

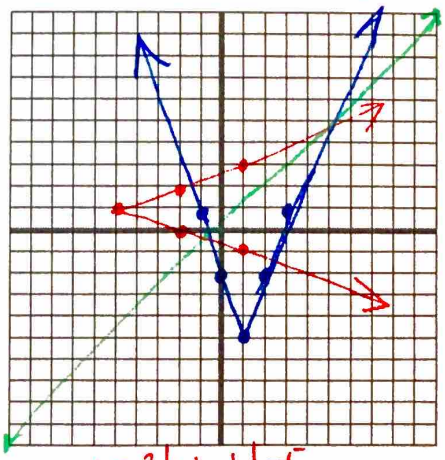
$x = y^2+4$

$x-4 = y^2$

$\pm\sqrt{x-4} = y$

$y^{-1} = \pm\sqrt{x-4}$

IV. $f(x) = 3|x-1|-5$



A	
x	y
-1	1
0	-2
1	-5
2	-2
3	1

B	
x	y
1	-1
-2	0
-5	1
-2	2
1	3

Relation

$y=x$

$x = 3|y-1|-5$

$x+5 = 3|y-1|$

$\frac{1}{3}x+\frac{5}{3} = |y-1|$

IV.

$\frac{1}{3}x+\frac{5}{3}=|y-1|$

$y-1=\frac{1}{3}x+\frac{5}{3}$ $\quad y-1=-\frac{1}{3}x-\frac{5}{3}$

$y=\frac{1}{3}x+\frac{5}{3}+\frac{3}{3}$ $\quad y=-\frac{1}{3}x-\frac{5}{3}+\frac{3}{3}$

$y=\frac{1}{3}x+\frac{8}{3}$ $\quad y=-\frac{1}{3}x-\frac{2}{3}$

$$y^{-1}=\begin{cases}\frac{1}{3}x+\frac{8}{3} \\ -\frac{1}{3}x-\frac{2}{3}\end{cases}, x\geq -5$$

I

D: $\mathbb{R}$

R: $\mathbb{R}$

II

D: $x\geq -2$

R: $y\geq -4$

III

D: $\mathbb{R}$

R: $y\geq 4$

IV.

D: $\mathbb{R}$

R: $y\geq -5$

D: $\mathbb{R}$

R: $\mathbb{R}$

D: $x\geq -4$

R: $y\geq -2$

D: $x\geq 4$

R: $\mathbb{R}$

D: $x\geq -5$

R: $\mathbb{R}$

The domain & range of inverse functions switch

Every $x=y$ & every $y=x$!

That's why the line of symmetry is $y=x$!