Review for Chapter 1 - Intro. to Functions

1. Describe the transformations to *f(x)*

$$g(x) = -3f\left(\frac{1}{2}(x-2)\right)+4$$

Vertical stretch by a factor of 3
Horizontal stretch by a factor of 2
Reflection over the x-axis
Translated 2 to the right and 4 up.

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2. a)Write an equation using the **square root** mother function for the following transformations:

-Vertical compression by a factor of $\frac{1}{3}$

-Horizontal stretch by a factor of 2
-Reflection over the y-axis
-Translated vertically up 5
-Translated horizontally left 4

$y = \frac{1}{3}\sqrt{-\frac{1}{2}(x+4)} + 5$

b) Write an equation for the above transformations if the mother function is the reciprocal function.

$y = \frac{\frac{1}{3}}{-\frac{1}{2}(x+4)} + 5$

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3. If (-2, 5) is a point on the function. Determine the coordinates of the image of this point on the graph

$$f(x) = -2f\left(\frac{1}{3}(x-4)\right)+6$$

x value
x 3
+ 4

(-2) x 3
= -6
-6 + 4
= -2

y value
x -2
+ 6

5 x -2 = -10
-10 + 6 = 4

(-2, -4)

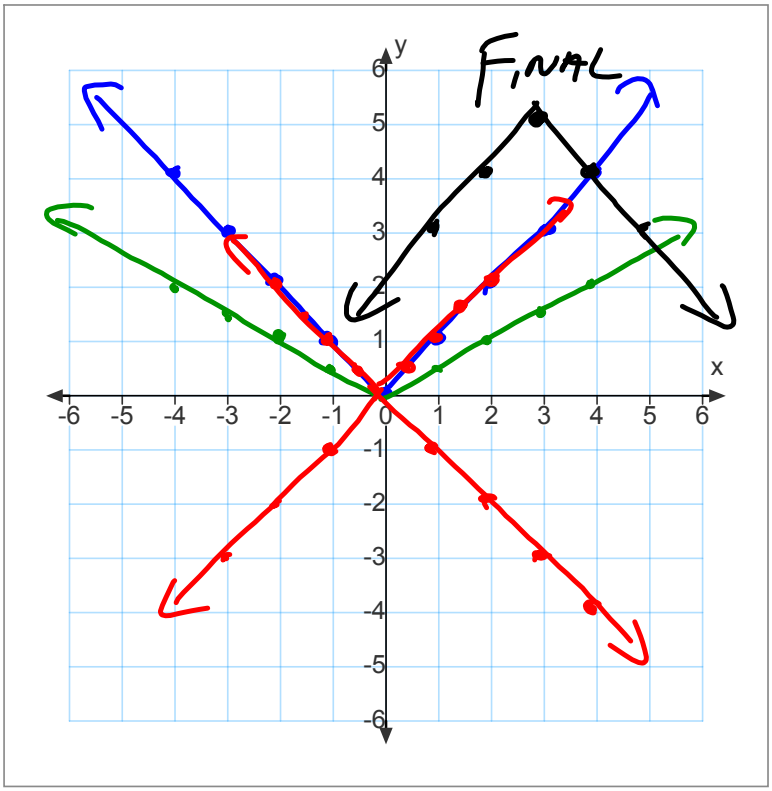
4. Graph each of the following functions and determine the domain and range.

a) $y = -\frac{1}{2}|2x-6|+5$

$y = -\frac{1}{2}|2(x-3)|+5$

mother graph

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



$D = \{x \in R\}$

$R = \{y \in R \mid y \leq 5\}$

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b) $f(x) = -3\sqrt{-2x+10} - 2$

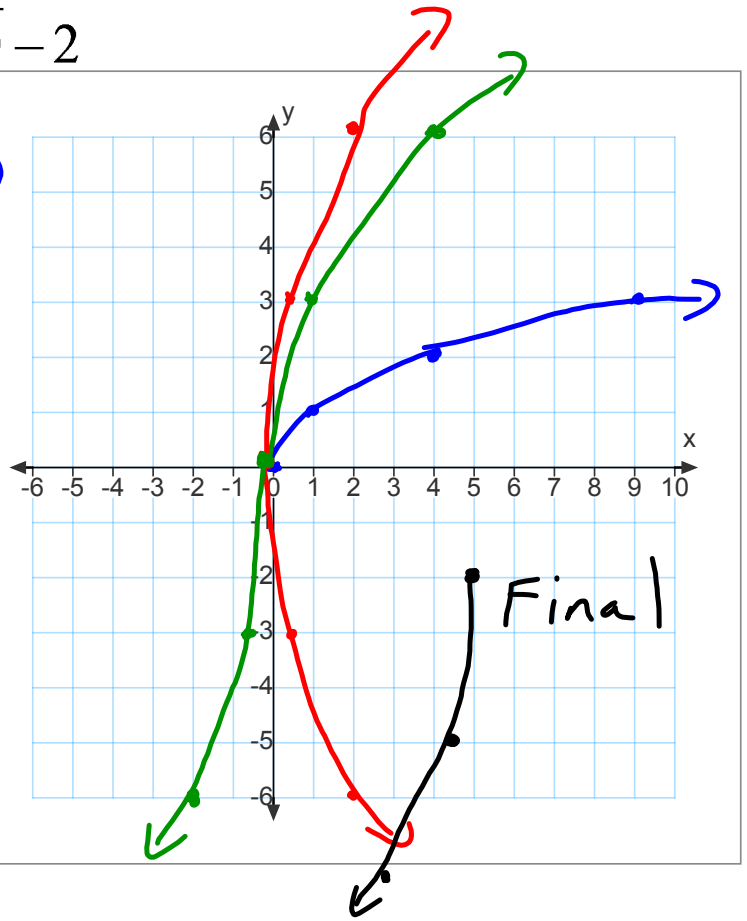
$y = -3\sqrt{-2(x-5)} - 2$

mother function

x	y
0	0
1	1
4	2
9	3

$D = \{x \in R \mid x \leq 5\}$

$R = \{y \in R \mid y \leq -2\}$



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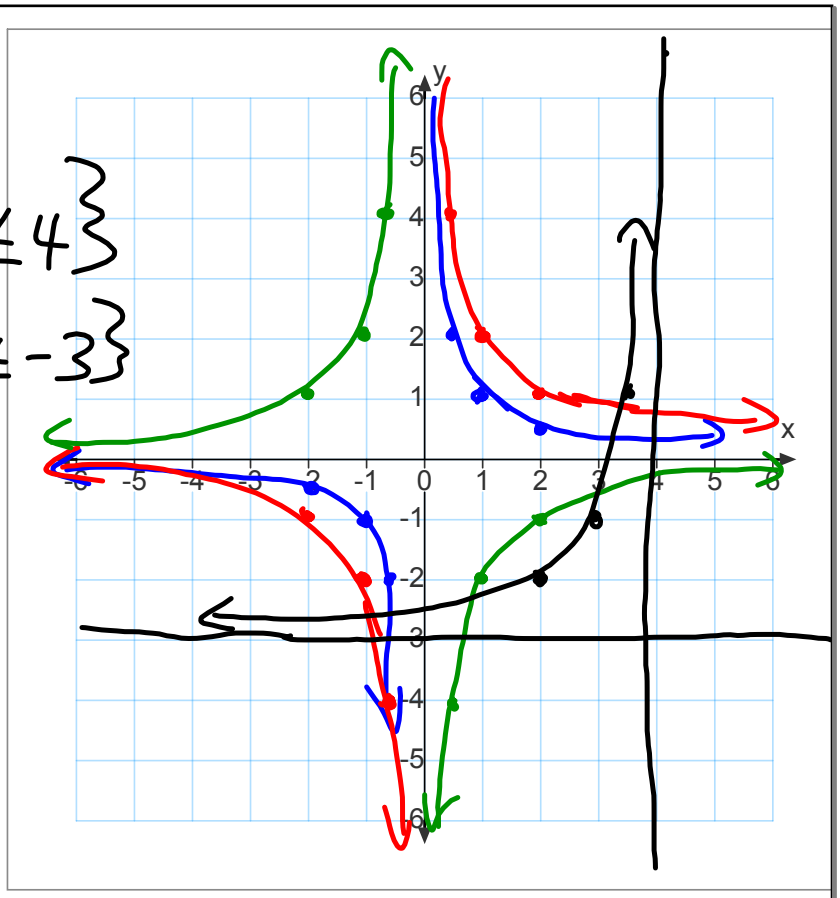
c) $y = \frac{2}{x-4} - 3$

$D = \{x \in R \mid x \neq 4\}$

$R = \{y \in R \mid y \neq -3\}$



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5. If $f(x) = 3x - 5$ and $g(x) = 2x^2 - 5$

Determine each of the following:

a) $f(-2)$

$= 3(-2) - 5$
$= -6 - 5$
$= -11$

b) $f(2) + g(-2)$

$= 3(2) - 5 + 2(-2)^2 - 5$
$= 6 - 5 + 2(4) - 5$
$= 6 - 5 + 8 - 5$
$= 4$

c) $g(x-3)$

$= 2(x-3)^2 - 5$
$= 2(x-3)(x-3) - 5$
$= 2(x^2 - 6x + 9) - 5$
$= 2x^2 - 12x + 18 - 5$
$= 2x^2 - 12x + 13$

d) $f(x) = -3$ *

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

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6. Determine the inverse of each of the following functions

a) $f(x) = 4x - 5$

$y = 4x - 5$

$x = 4y - 5$

$x + 5 = 4y$

$\frac{x+5}{4} = y$

b) $\{(-5,3),(2,4),(6,-1),(-2,8)\}$

$= \{(3,-5),(4,2),(-1,6),(8,-2)\}$

c) $y = -3(x-5)^2 + 8$

$x = -3(y-5)^2 + 8$

$x - 8 = -3(y-5)^2$

$\frac{x-8}{-3} = (y-5)^2$

$\pm\sqrt{\frac{x-8}{-3}} = y - 5$

$\pm\sqrt{\frac{x-8}{-3}} + 5 = y$

d) $f(x) = -2\sqrt{3x-6} + 5$

$y = -2\sqrt{3x-6} + 5$

$x = -2\sqrt{3y-6} + 5$

$x - 5 = -2\sqrt{3y-6}$

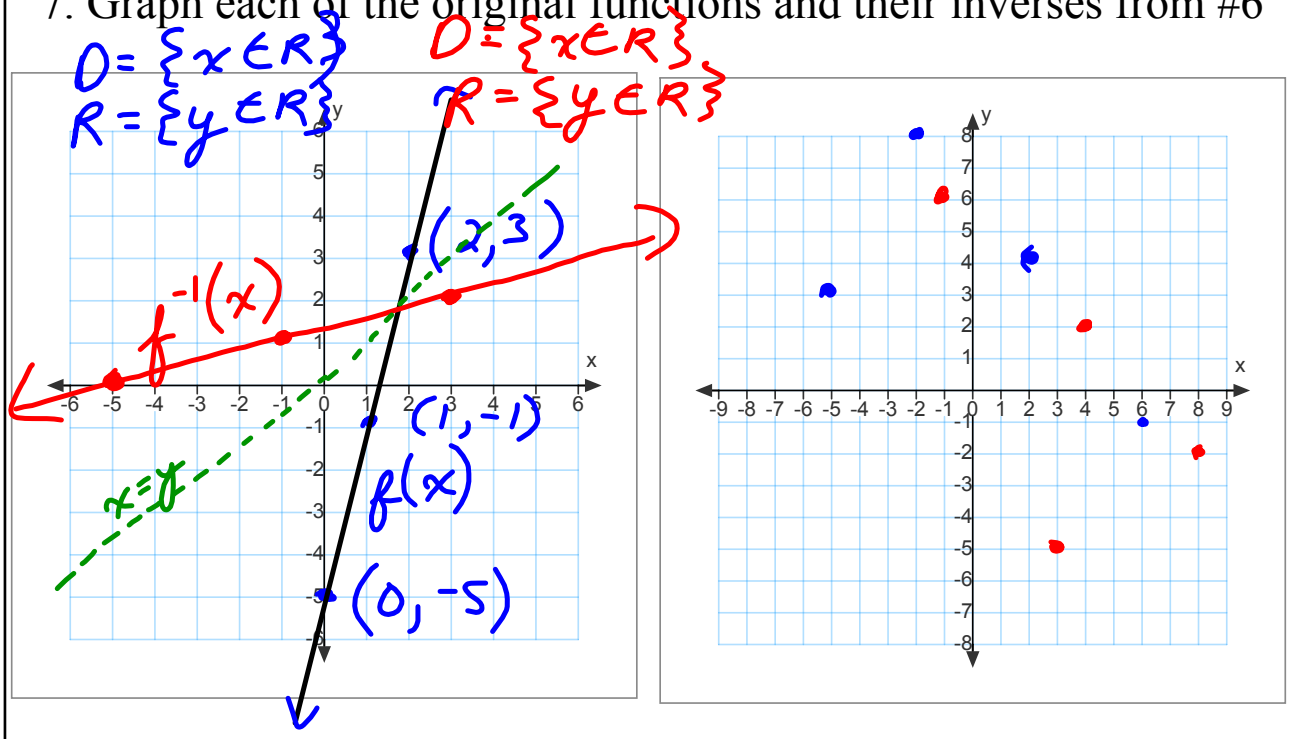
$\frac{x-5}{-2} = \sqrt{3y-6}$

$\left(\frac{x-5}{-2}\right)^2 = 3y - 6$

$\left(\frac{x-5}{-2}\right)^2 + 6 = 3y$

$\frac{\left(\frac{x-5}{-2}\right)^2 + 6}{3} = y$

7. Graph each of the original functions and their inverses from #6



a) $f(x) = 4x - 5$

$f^{-1}(x)$

b) $\{(-5,3),(2,4),(6,-1),(-2,8)\}$

$f^{-1}(x)$

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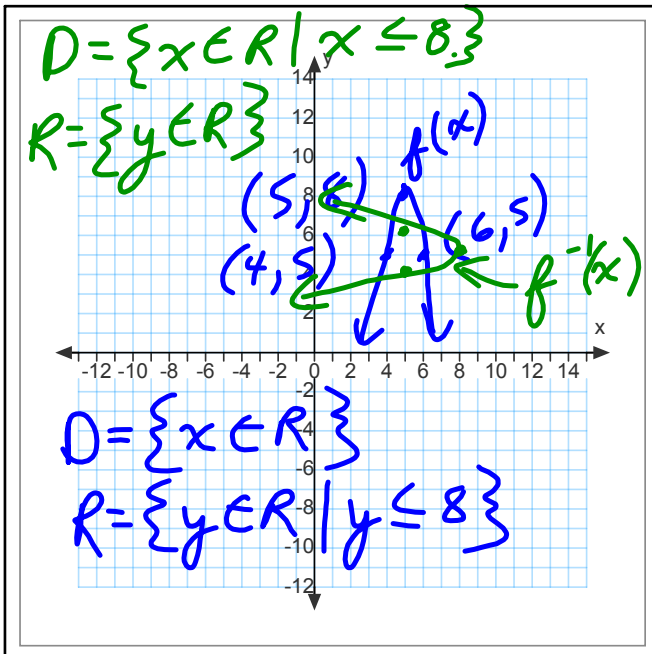

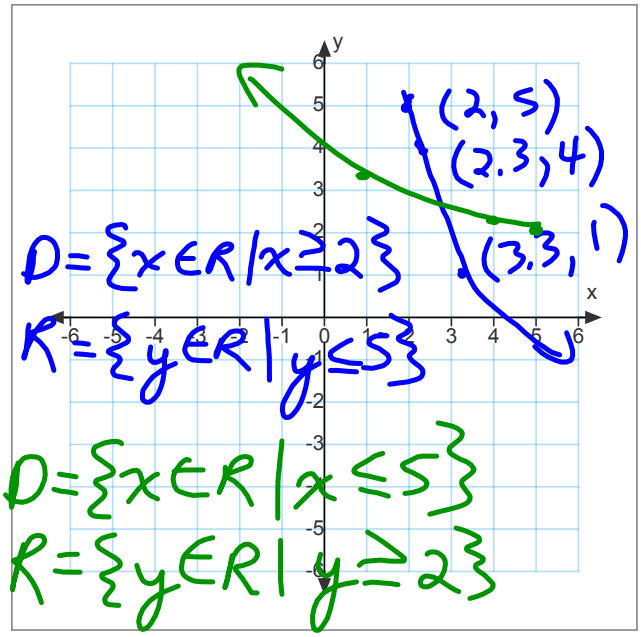

c) $y = -3(x-5)^2 + 8$

The inverse is NOT a function

d) $f(x) = -2\sqrt{3x-6} + 5$

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

$f^{-1}(x)$

8. Determine the domain and range of each inverse function above.

ON Graphs
with colour

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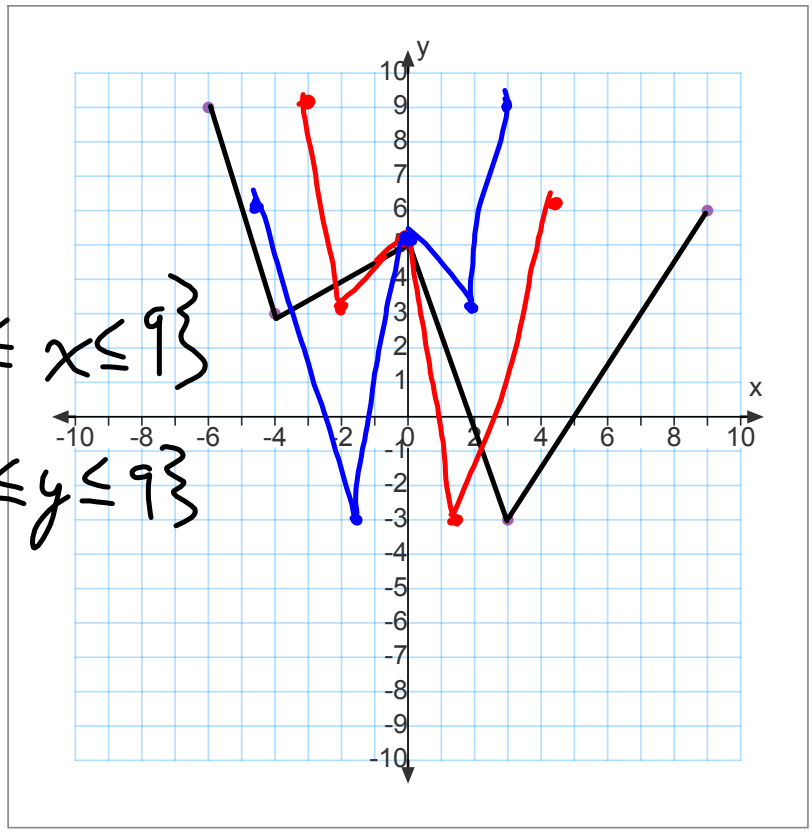
9. Given $f(x)$ determine $f(\frac{1}{2}x)$.

Graph



Final Graph

$D=\{x \in R \mid -6 \leq x \leq 9\}$

$R=\{y \in R \mid -3 \leq y \leq 9\}$

ORIGINAL

10. Determine the domain and range of each function in all the questions above.

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11. Be able to identify what are functions and WHY - just like quiz

Go over old quizes and homework

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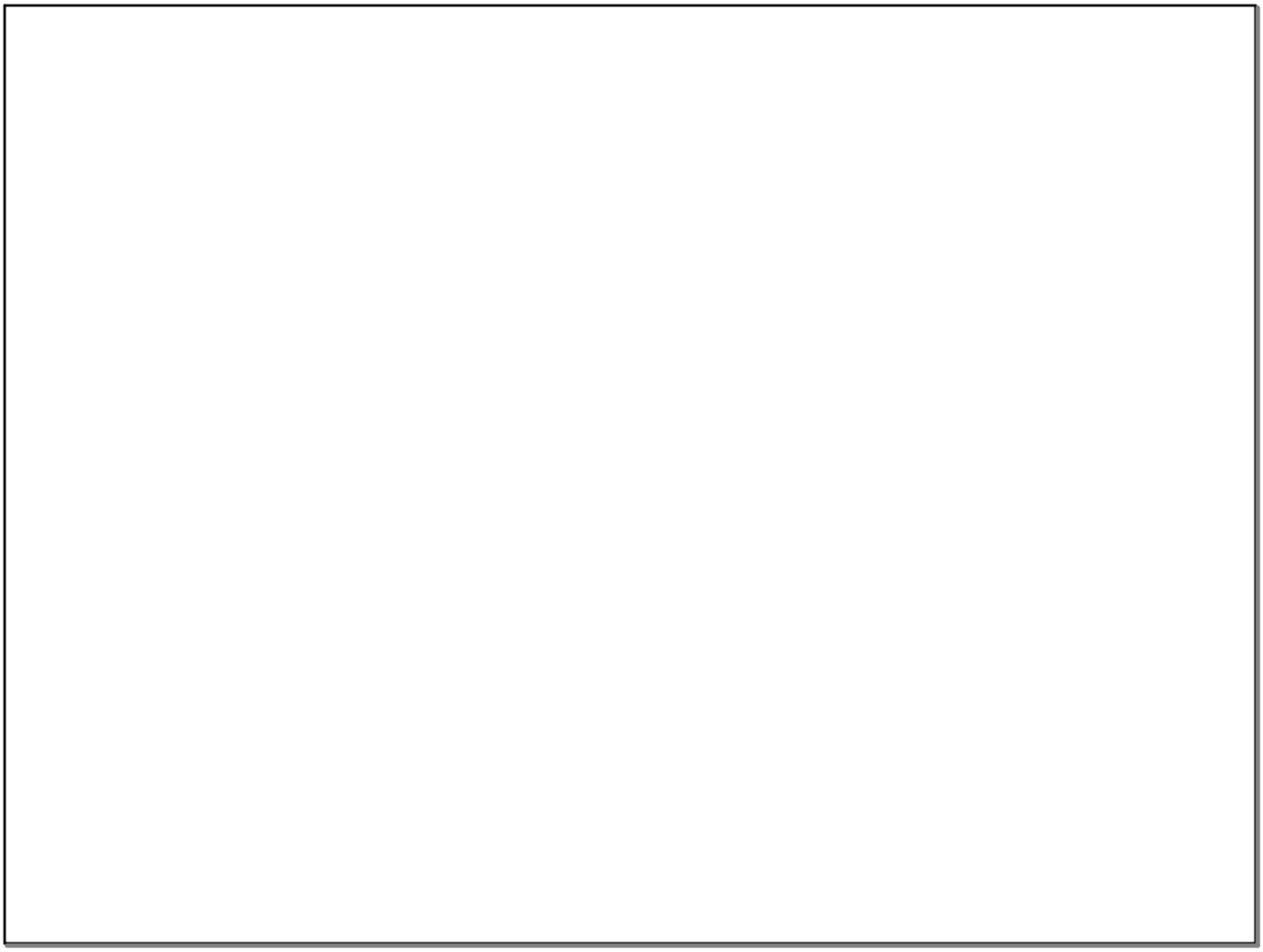

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