Today's Learning Goal(s):

Date: _____

By the end of the class, I will be able to:

a) determine the inverse of a linear function.

SWYK First?

8c

Last day's work: pp. 70-73 #6bc, 7c, (8,9)ac, 10, 12, 16, 18 [20, 22]
+3 Quesons

p. 71 #7c

7. If $f(x) = x^2$, sketch the graph of each function and state the domain and range.

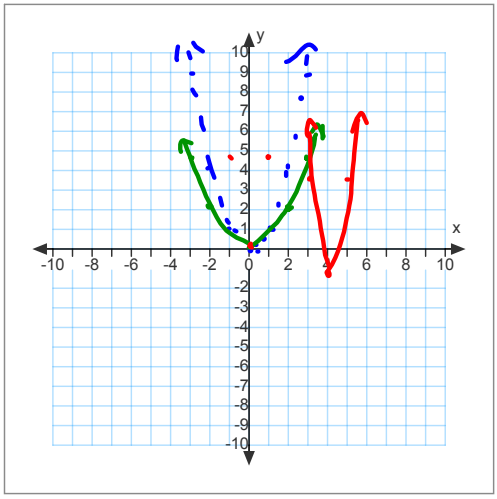
a) $y = f(x - 2) + 3$

c) $y = 0.5f(3(x - 4)) - 1$

$= 0.5(3(x-4))^2 - 1$

D: $\{x \in \mathbb{R}\}$

R: $\{y \in \mathbb{R} \mid y \geq -1\}$



8. If $f(x) = \sqrt{x}$, sketch the graph of each function and state the domain and range.

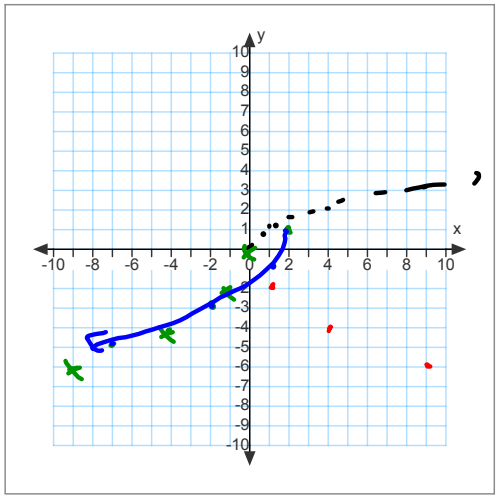
a) $y = f(x - 1) + 4$

c) $y = -2f(-(x - 2)) + 1$

$= -2\sqrt{-(x-2)} + 1$

D: $\{x \in \mathbb{R} \mid x \leq 2\}$

R: $\{y \in \mathbb{R} \mid y \leq 1\}$



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a) determine the inverse of ~~a linear~~ function~~s~~

1.5 Inverse Functions

Date: Mar. 2/18

Inverse functions "undo" each other.

Ex.1 Complete the tables of values for each function:

$y = 2x + 1$

x	y
0	1
1	3
2	5
3	7

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

x	y
1	0
3	1
5	2
7	3

Do you see a relationship between each of the equations above?

$y = \frac{x-1}{2}$ is the inverse of $y = 2x + 1$ because it "undoes" the function $y = 2x + 1$.

To determine the inverse of a function the x and y values are interchanged. In other words the domain and the range switch.

The inverse of a relation can be found by interchanging the domain & range:

Ex.2 What is the inverse of $\{(1, 5), (-3, 8), (9, 2), (7, -4)\}$?

$\{(5, 1), (8, -3), (2, 9), (-4, 7)\}$

If the inverse of a function f(x) is also a function, it is denoted

$$f^{-1}(x)$$

[Read as "the inverse of f" or "f-inverse"]

Ex.3 Find the inverse of the following functions and sketch the graphs of $f(x)$ and it's inverse.

a) $f(x) = 4x + 3$

$y = 4x + 3$

$m = 4 \quad b = 3$

$= \frac{4}{1}\left(\frac{\text{rise}}{\text{run}}\right)$

$= \frac{-4}{-1}$

Inverse (interchange x & y)

$x = 4y + 3$

$x - 3 = 4y$

$\frac{x-3}{4} = y$

$\frac{1}{4}x - \frac{3}{4} = y$

$b = -\frac{3}{4}$

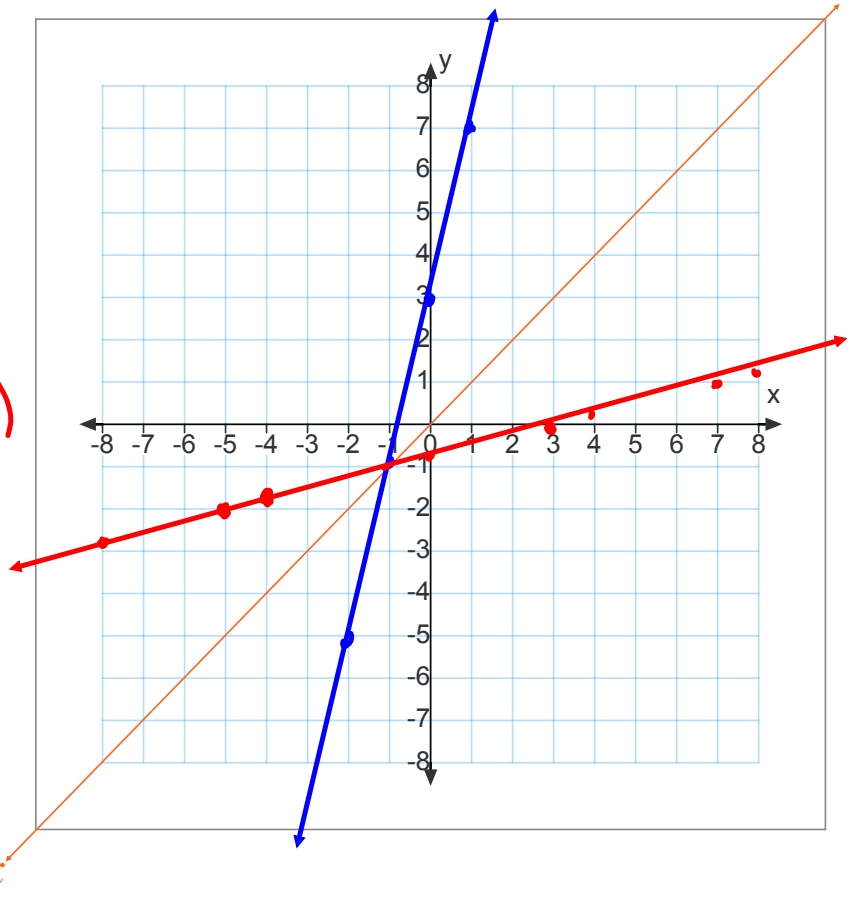
$m = \frac{1}{4}$

or

$\frac{-4y}{-4} = \frac{-x+3}{-4}$

$y = \frac{x}{4} - \frac{3}{4}$

$\therefore f^{-1}(x) = \frac{x}{4} - \frac{3}{4}$



If time, (otherwise, continue to summary on next slide)

b) $g(x) = (x-3)^2 - 4$

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

$V(3,-4)$

Inverse

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

$\pm\sqrt{x+4} = \sqrt{(y-3)^2}$

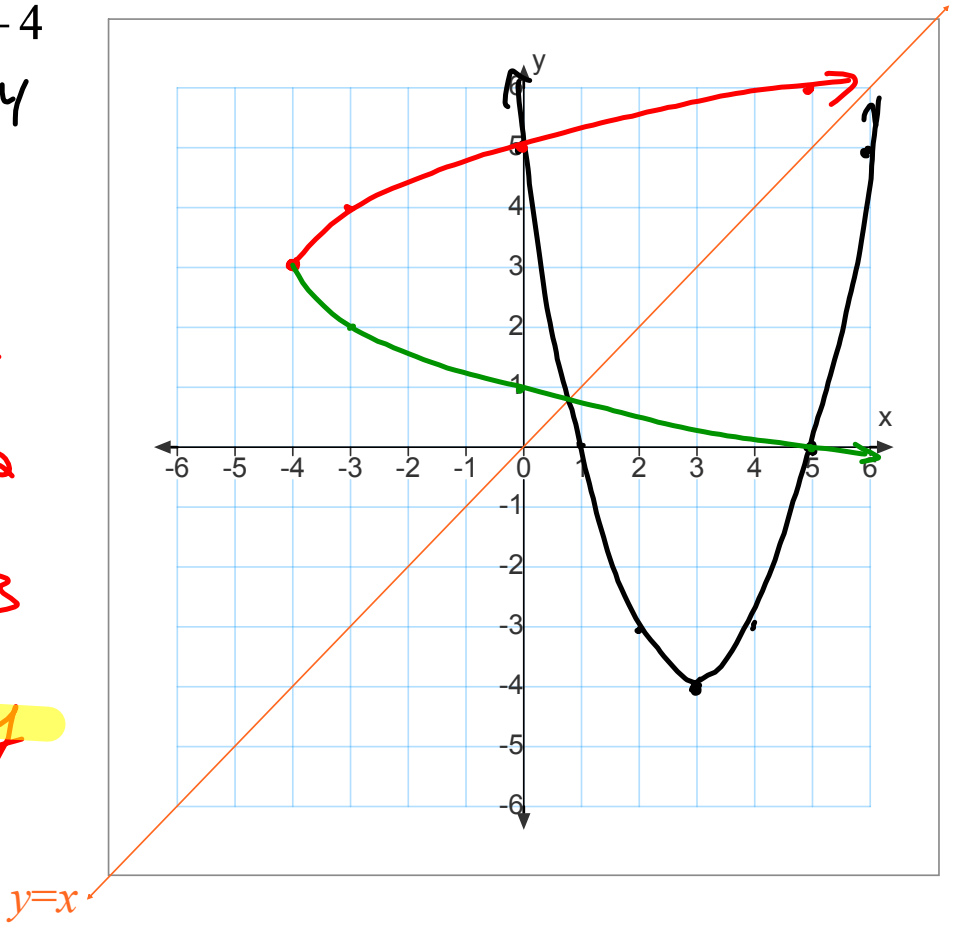
$\pm\sqrt{x+4} = y-3$

$\pm\sqrt{x+4} + 3 = y$

$y = +\sqrt{x+4} + 3$

or

$y = -\sqrt{x+4} + 3$



What do you notice about the inverse function graphs?

They reflect over the $y = x$ line.

In summary,

$f^{-1}(x)$ reflects over the line $y = x$

$-f(x)$ reflects over the x-axis

$f(-x)$ reflects over the y-axis

Today's Homework Practice includes:

pp. 46-49 #2 – 4, (5 – 7)ace, 12

[19, 20]