Today's Learning Goal(s):

Date: _____

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

a) determine the inverse of functions.

~~SWYK First?~~

Return and Correct Yesterday's Checkpoint 2.1

Last day's assigned practice: pp. 70-71 #4def, 5cd, 6a, 7a

Correct Homework?

$$y = af(k(x-d)) + c$$

5. Sketch each set of functions on the same set of axes.
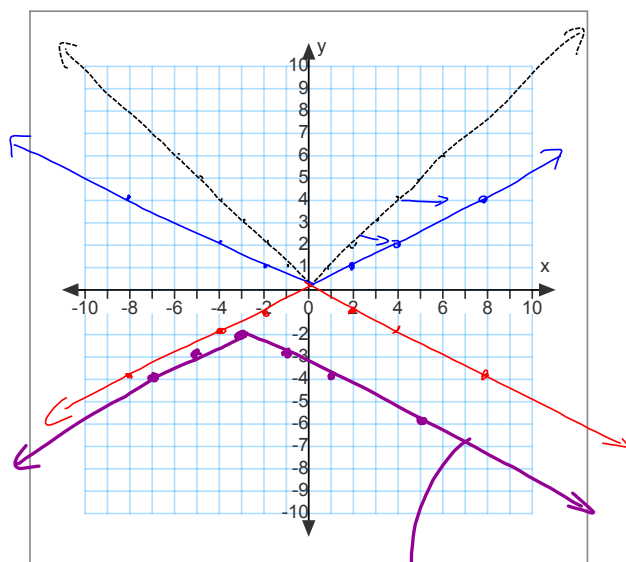
a) $y = x^2, y = 3x^2, y = 3(x-2)^2 + 1$

b) $y = \sqrt{x}, y = \sqrt{3x}, y = \sqrt{-3x}, y = \sqrt{-3(x+1)} - 4$

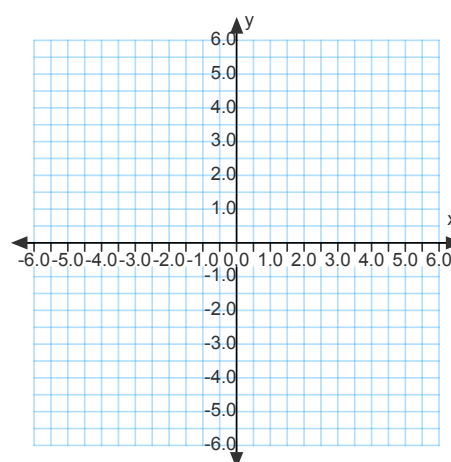c) $y = \dfrac{1}{x}, y = \dfrac{2}{x}, y = -\dfrac{2}{x}, y = -\dfrac{2}{x-1} + 3$

d) $y = |x|, y = \left|\dfrac{1}{2}x\right|, y = -\left|\dfrac{1}{2}x\right|, y = -\left|\dfrac{1}{2}(x+3)\right| - 2$

$k = \dfrac{1}{2}$

$$\frac{1}{\frac{1}{2}} = 1 \div \frac{1}{2} = 1 \times \frac{2}{1} = 2$$

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

Show What You Know

postponed until next class.

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1.5 Inverse Functions

Date: Feb. 28/20

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?

$y = \dfrac{x-1}{2}$ 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: $(x,y) \rightarrow (y,x)$

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

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

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

$\leftarrow$ linear $: y = mx + b$

$b = 3$

$m = 4 \quad \dfrac{rise}{run}$

slope $\quad \dfrac{4}{1}$

interchange $x + y$
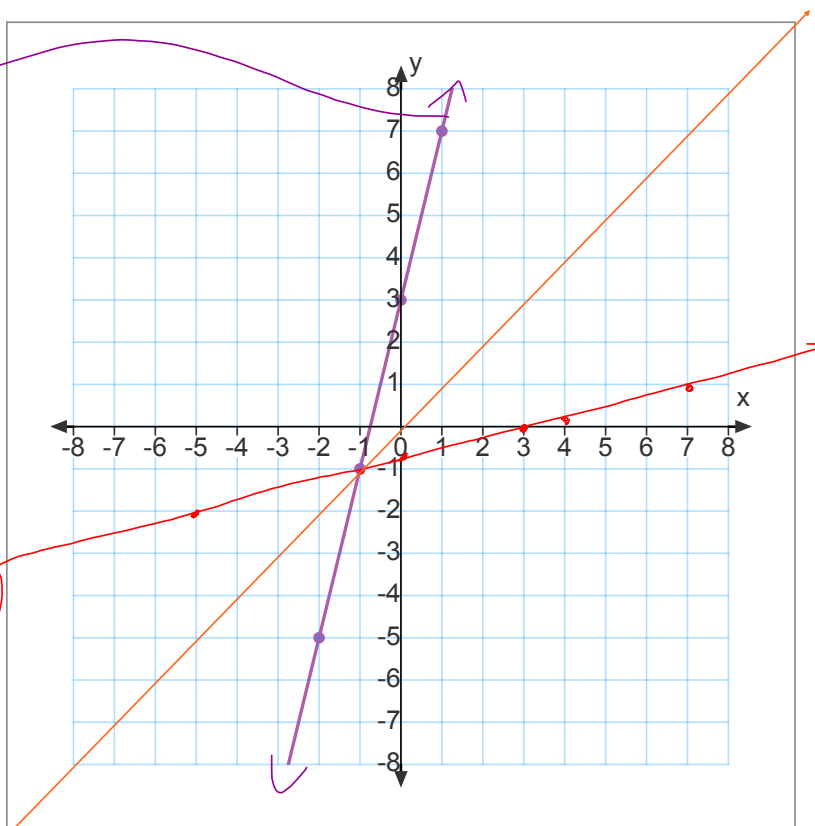
$f(x): \quad y = 4x + 3$

$\qquad x = 4y + 3$

$\qquad x - 3 = 4y$

$\qquad \dfrac{x-3}{4} = y$

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

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

$y = x$

$y = 4x + 3$

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

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

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

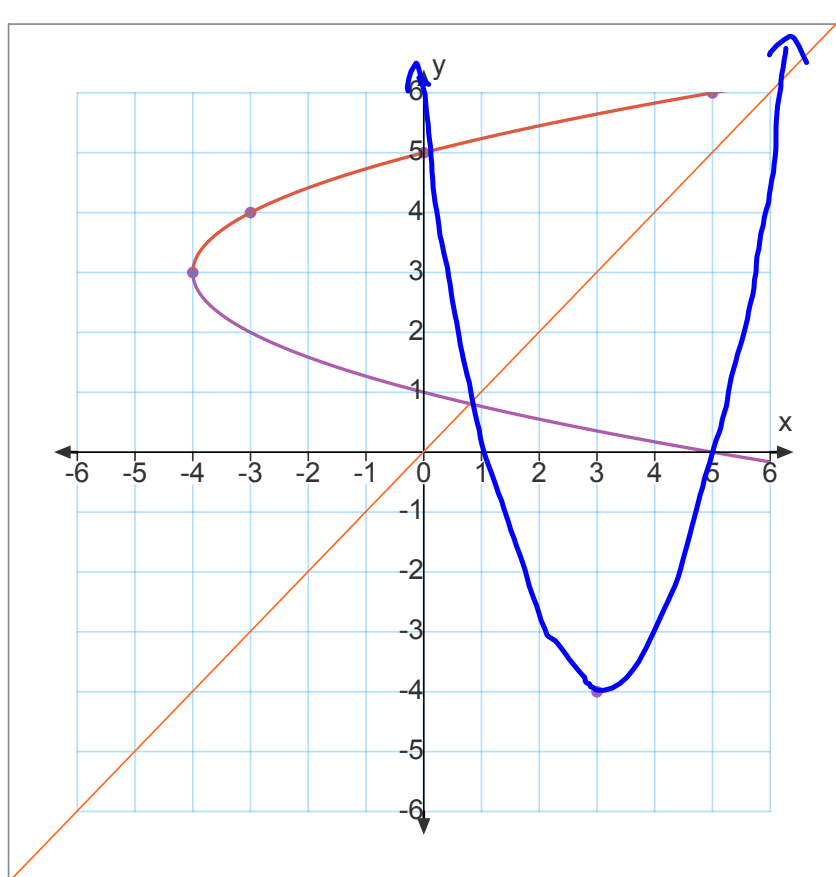$y = (x-3)^2 - 4$

Inverse:

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

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

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

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

DO NOT

$y=x$

use function notation
because the inverse is
NOT a Function.

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

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

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

What do you notice about the inverse function graphs?

They reflect in the $y = x$ line.

In summary,

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

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

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

Are there any questions from last day's assigned work you would like to see on the board?

Last day's assigned pracce: pp. 70-71 #4def, 5cd, 6a, 7a

Today's Assigned Practice includes:
  READ pp.41-46
  pp. 46-49 #2 – 4, (5 – 7)ace, 12
              [19, 20]