

Today's Learning Goal(s):

Date: Mar 5/19

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

- determine the inverse of functions.

~~SWYK First?~~

Return and Correct Yesterday's Checkpoint 2.2

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

p. 71

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

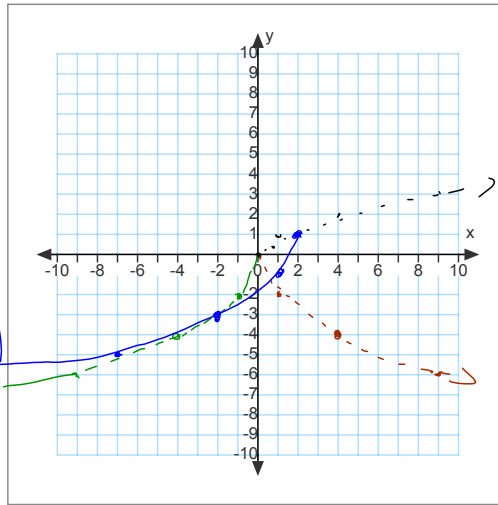
BW missing ref. in x

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

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

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

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



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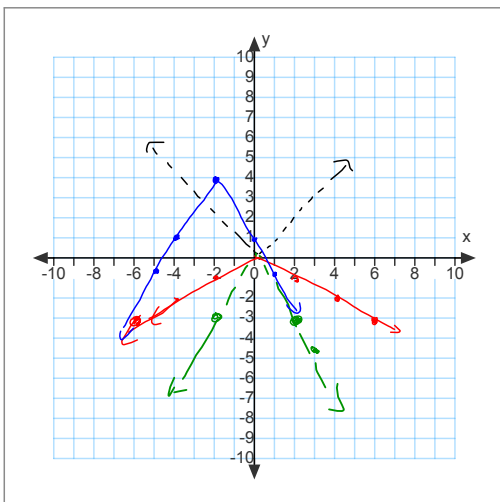
9. If $f(x) = |x|$, sketch the graph of each function and state the domain and range.

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

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

b) $y = 4f(2(x - 1)) - 2$

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



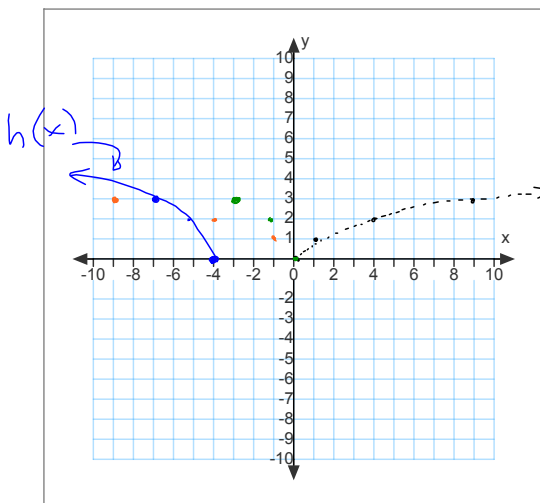
p. 71

12. For $f(x) = \sqrt{x}$, sketch the graph of $h(x) = f(-3x - 12)$.

$\therefore h(x) = \sqrt{-3x - 12}$

$= \sqrt{-3(x+4)}$

↳ hc by a factor $\frac{1}{3}$



p. 72 18. Match each equation to its graph. Explain your reasoning.

recip; ht + v.t. a) $y = \frac{3}{-(x-2)} + 1$

e) $y = -\frac{4}{x} - 3$ recip.; no h.t.

Abs; v.s. b) $y = 2|x - 3| - 2$

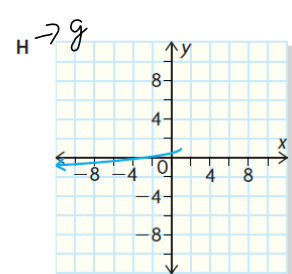
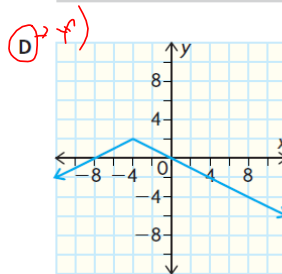
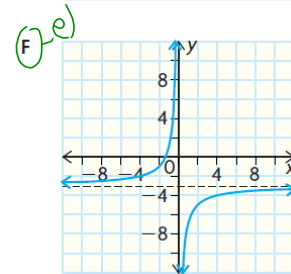
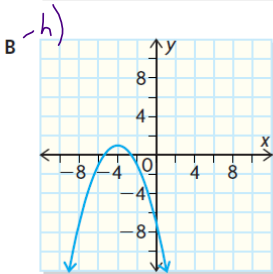
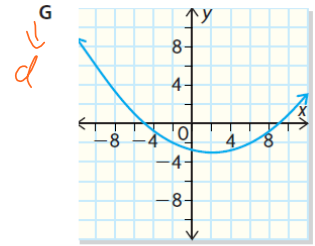
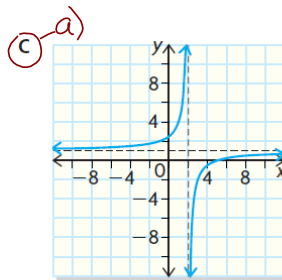
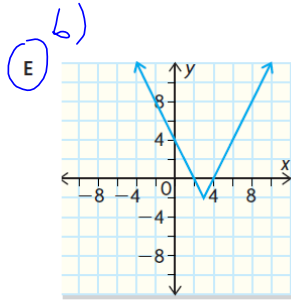
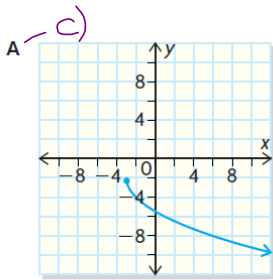
f) $y = -0.5|x + 4| + 2$ Abs; v.c.

sqrd. \rightarrow c) $y = -2\sqrt{x+3} - 2$

g) $y = -0.5\sqrt{1-x} + 1 \rightarrow y = -0.5\sqrt{-x+1} + 1$

refl in x-axis only d) $y = (0.25(x-2))^2 - 3$

h) $y = -\frac{1}{2}(x+4)^2 + 1$
 \hookrightarrow refl. in x-axis
 \hookrightarrow refl. in y-axis
 \hookrightarrow refl in x-axis



p. 73 20. If $f(x) = (x - 2)(x + 5)$, determine the x -intercepts for each function.

a) $y = f(x)$

b) $y = -4f(x)$

c) $y = f\left(-\frac{1}{3}x\right) \rightarrow$ refl. in y -axis

d) $y = f(-(x + 2))$

$x = 2 \rightarrow x = -2 \rightarrow x = -6$

$x = -5 \rightarrow x = 5 \rightarrow x = 15$

h.s. by a factor of 3

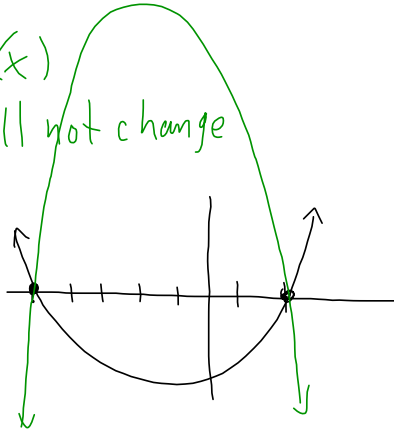
a) for x -int, let $y = 0$

$0 = (x - 2)(x + 5)$

$\therefore x = 2$ or $x = -5$

b) $y = -4f(x)$

\hookrightarrow a v.s. will not change the x -ints.



\rightarrow refl. in x -axis

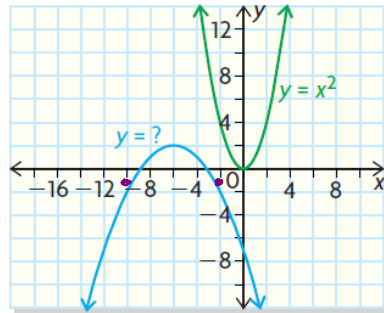
$x = 2 \rightarrow x = -2 \rightarrow x = -4$

$x = -5 \rightarrow x = 5 \rightarrow x = 3$

h.t. 2 units left \rightarrow

Extending

22. The graphs of $y = x^2$ and another parabola are shown.



\nearrow refl. in x -axis
v.c. or h.s

h.t. 6 units left
v.t. 2 units up

a) Determine a combination of transformations that would produce the second parabola from the first.

b) Determine a possible equation for the second parabola.

if $a = \frac{1}{4}$

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

if $k = \frac{1}{2}$

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

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

- a) determine the inverse of functions.

1.5 Inverse Functions

Date: Mar 5/19

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

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 its inverse.

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

$$y = mx + b$$

$$b = 3$$

$$m = \frac{4}{1} \text{ rise over run}$$

To find the inverse, interchange x and y , then solve for y .

$$y = 4x + 3$$

$$x = 4y + 3$$

$$x - 3 = 4y$$

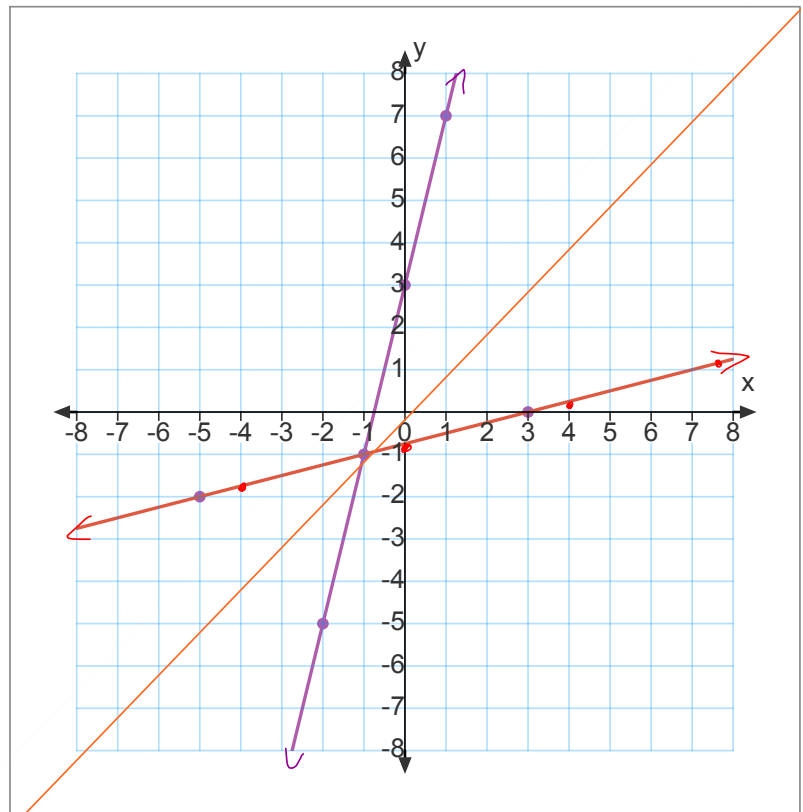
$$\frac{x - 3}{4} = y$$

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

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

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

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



$y = x$

$$y = 4x + 3$$

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

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

$v(3, -4)$
 $a=1 \therefore$ regular
 "step pattern"
 MG over ups
 1 1
 2 4
 3 9
 Inverse:

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

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

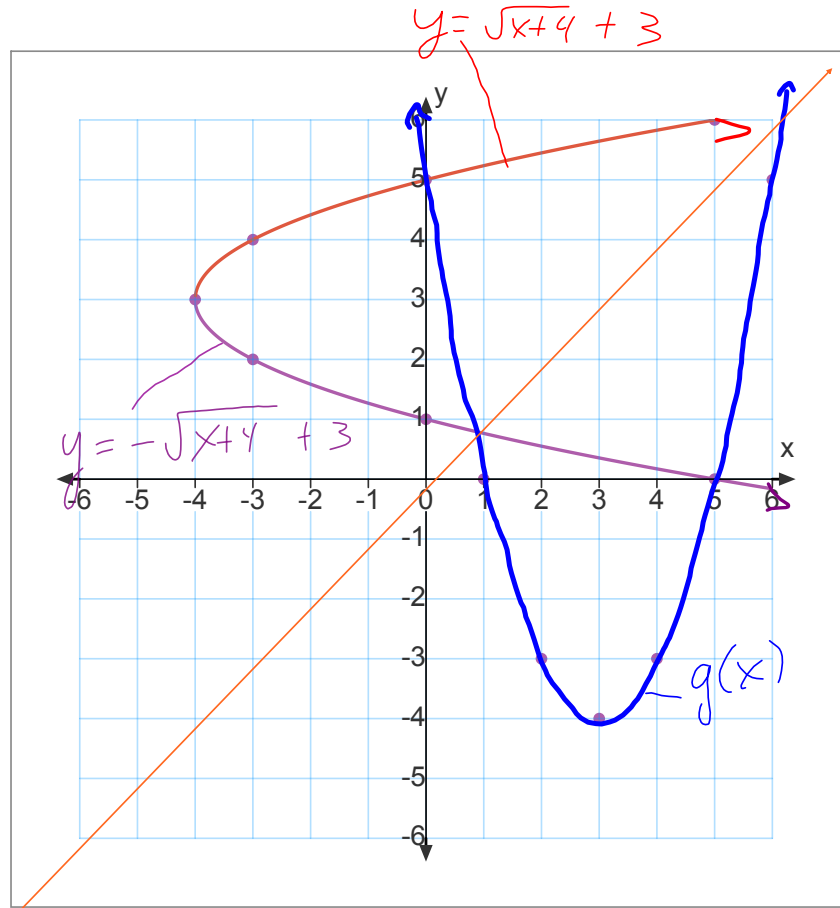
$\pm\sqrt{x+4} = y-3$ $y=x$

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

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

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

Do NOT use function notation
 because the inverse is NOT A FUNCTION.



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

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

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

Extra
 $x^2 = 9$
 $x = \pm\sqrt{9}$
 $= \pm 3$

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

Today's Homework Practice includes:

pp. 46-49 #2 – 4, (5 – 7)ace, 12

[19, 20]