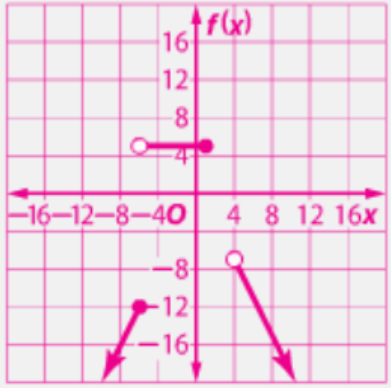
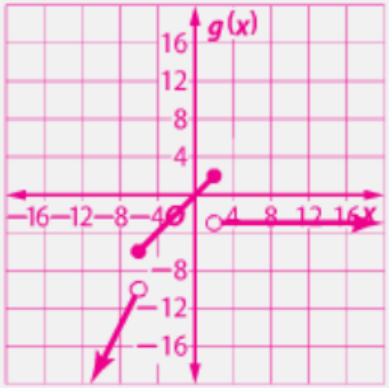
p105(12-17)

13.



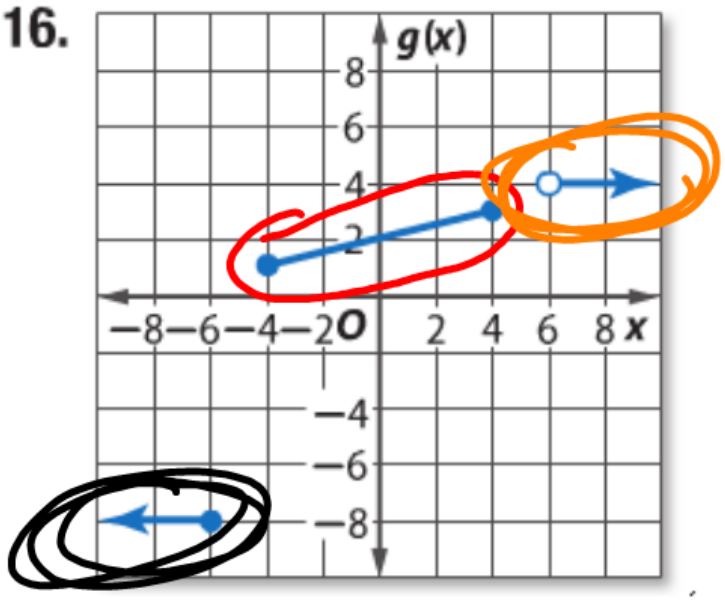
D = $\{x \mid x \leq 2 \text{ or } x > 4\}$;
R = $\{f(x) \mid f(x) < -7, \text{ or } f(x) = 5\}$

14.



D = {all real numbers};
R = $\{g(x) \mid g(x) < -10 \text{ or } -6 \leq g(x) \leq 2\}$

16.



$$f(x) = \begin{cases} -8 & \text{if } x \le -6 \\ \frac{1}{4}x + 2, & -4 \le x \le 4 \\ 4, & x > 6 \end{cases}$$

x	y
6	4
7	4
8	4

x	y
-6	-8
-7	-8
-8	-8

x	y
-4	1
4	3

FIND THE EQUATION

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{3-1}{4--4} = \frac{2}{8} = \frac{1}{4}$$

$$y - y_1 = m(x - x_1)$$

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

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

$$+3 \qquad +3$$

Let's graph $y = |x|$

$f(x) = |x|$, defined as

$$f(x) = \begin{cases} x \text{ if } x > 0 \\ 0 \text{ if } x = 0 \\ -x \text{ if } x < 0 \end{cases}$$

$y = |x|$

How are these different from the original parent function?

$y = |x| + 3$ $\quad$ $y = |x + 1|$ $\quad$ $y = -2|x|$

* || MAKES A "V"

$$y = a|x - h| + k$$

- FLIPS

CHANGES SLOPE

TRIES TO GET BACK TO 0

$$y = 3|x + 2| - 4$$

2

4

$x + 2 = 0$

$-2 \quad -2$

$x = -2$

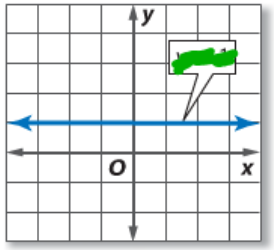
2.7: Parent Functions & Transformations

KeyConcept Parent Functions

Constant Function

FLAT LINE

NO X

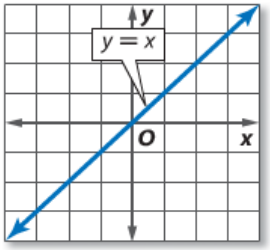


The general equation of a constant function is $f(x) = a$, where a is any number. The domain is all real numbers, and the range consists of a single real number a.

Identity Function

LINEAR

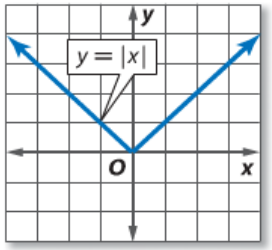
$y = mx + b$



The identity function $f(x) = x$ passes through all points with coordinates (a, a). It is the parent function of most linear functions. Its domain and range are all real numbers.

Absolute Value Function

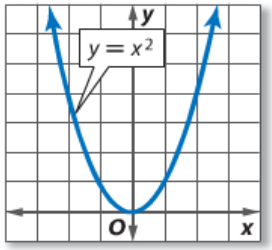
$|\ |$



Recall that the parent function of absolute value functions is $f(x) = |x|$. The domain of $f(x) = |x|$ is the set of real numbers, and the range is the set of real numbers greater than or equal to 0.

Quadratic Function - PARABOLA

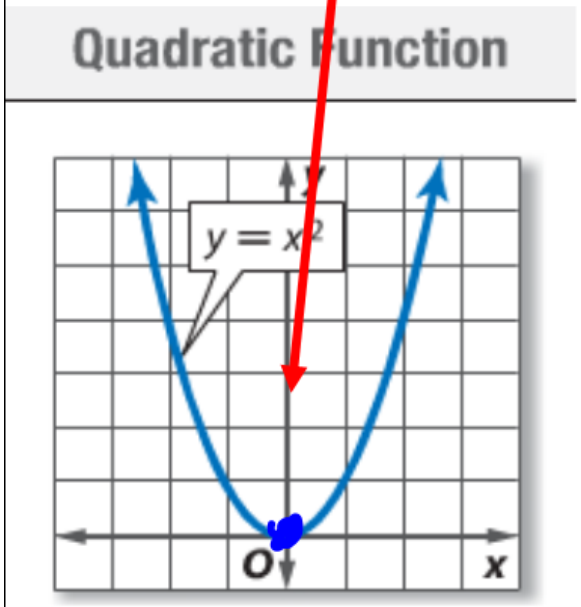
x^2



The parent function of quadratic functions is $f(x) = x^2$. The domain of $f(x) = x^2$ is the set of real numbers, and the range is the set of real numbers greater than or equal to 0.

How does

this **turn into** **this??**



$$y = a(x-h)^2 + k$$

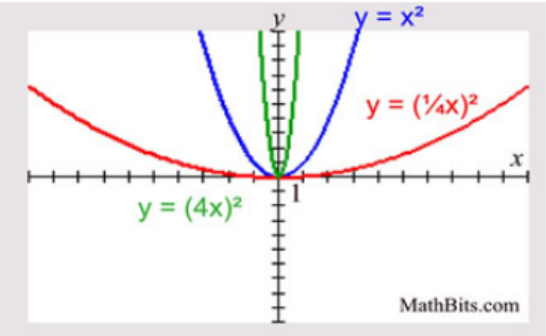
$$-\frac{1}{2}(x-?)^2 + ?$$

Transformations

Translations: SLIDING

Reflections: FLIPPED

Dilations: STRETCHING



What transformations?

$$f(x) = -3|4x+2| - 7$$

Math Practice:

p113(1-4,10-19)