

1.1 – Relations and Functions

Definitions:

domain

the set of all values of the independent variable of a relation

range

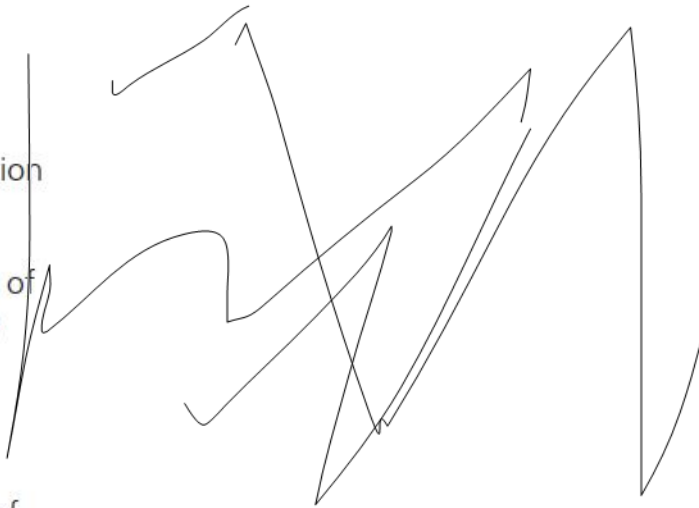
the set of all values of the dependent variable of a relation

relation

a set of ordered pairs; values of the independent variable are paired with values of the dependent variable

function

a relation where each value of the independent variable corresponds with only one value of the dependent variable

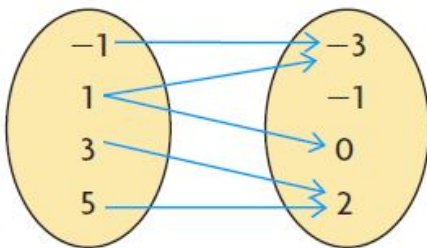


From your text: pg 10 #1.

State the domain, range and whether it is a function.

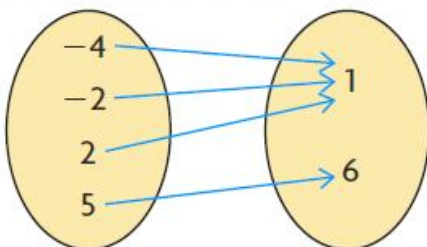
a) $\{(-5, 1), (-3, 2), (-1, 3), (1, 2)\}$

b)

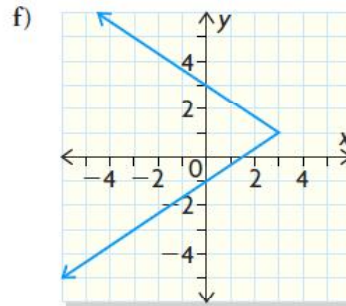
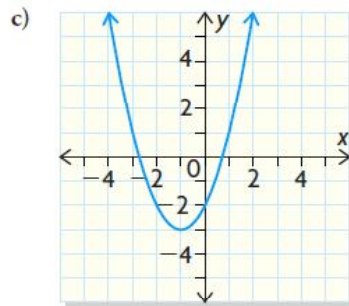
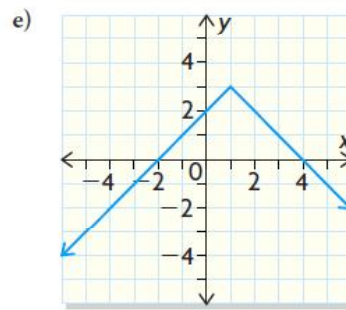
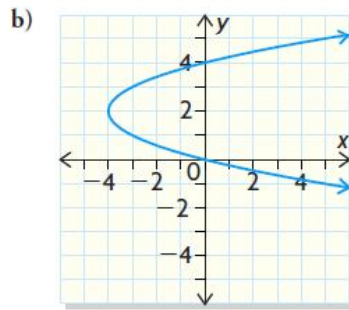
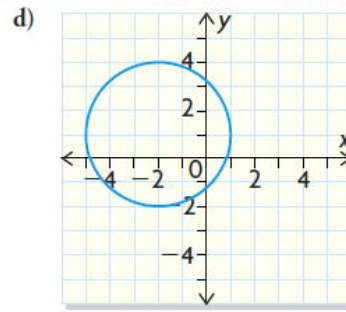
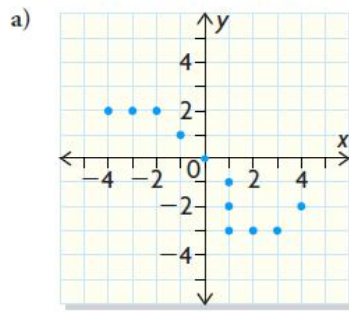


c) $\{(0, 4), (3, 5), (5, -2), (0, 1)\}$

d)



2. Use a ruler and the vertical-line test to determine which graphs are functions.



3. Substitute -6 for x in each equation and solve for y . Use your results to explain why $y = x^2 - 5x$ is a function but $x = y^2 - 5y$ is not.

1.2 –Function Notation

The key word in “function notation” is notation. Today we are looking at a different way of doing what we have already done in the past, but with different notation.

$$h(t) = t^2 + 2t; \text{ Find } h(-8)$$

$$w(t) = 3t^3 + 3; \text{ Find } w(2)$$

$$g(x) = x^2 + 2x$$

$$h(x) = 3x$$

$$\text{Find } g(-3) - h(-3)$$

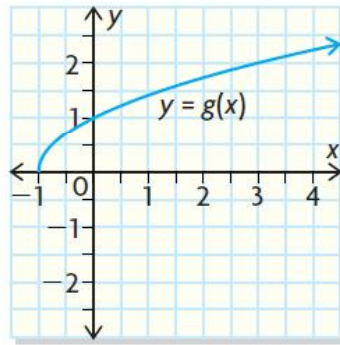
$$g(t) = -t - 3$$

$$f(t) = 2t + 4$$

$$\text{Find } (g + f)(7)$$

For the function shown in the graph, determine each value.

- a) $g(3)$
- b) $g(-1)$
- c) x if $g(x) = 1$
- d) the domain and range of $g(x)$

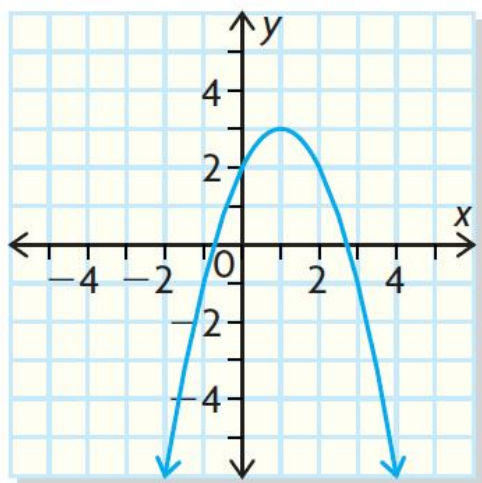


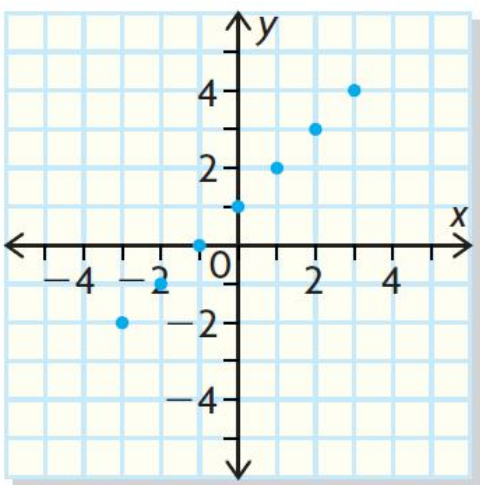
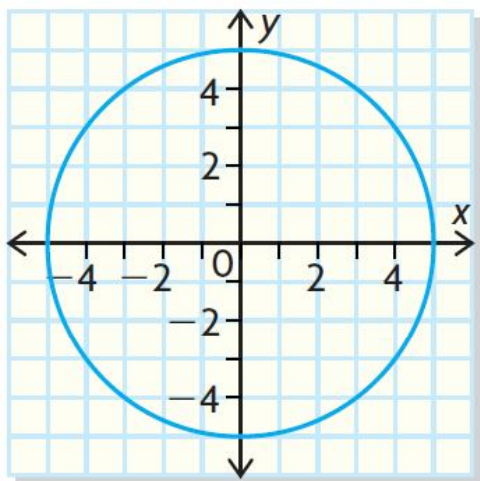
1.3 – Parent Functions

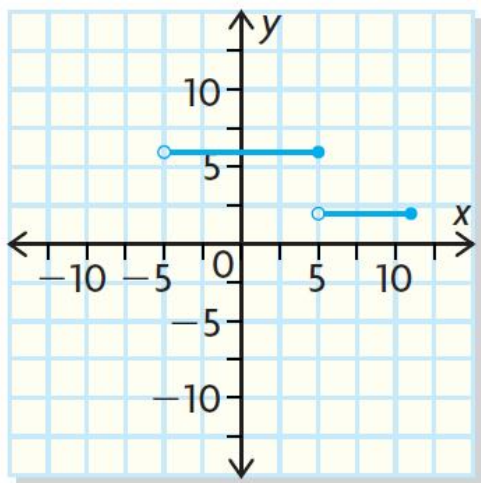
1.4 – Domain and Range Part 1

- Domain: the set of all possible x-values or inputs
 - restrictions
- Range: the set of all possible y-values or outputs
 - values that cannot be produced

Fancy Schmancy Notation

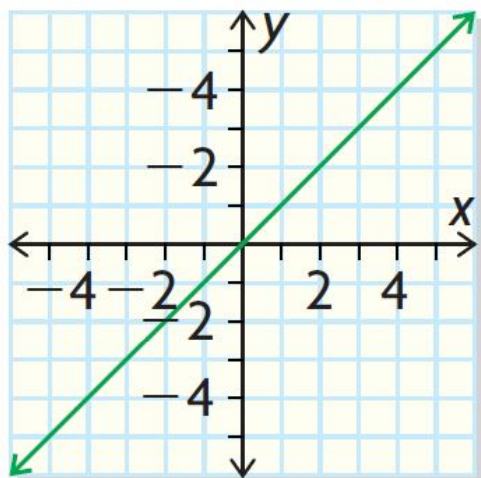


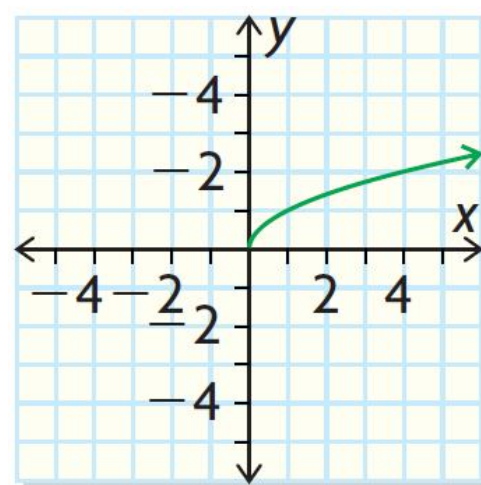
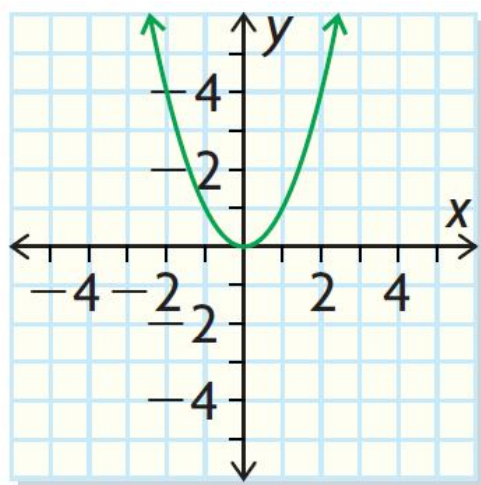


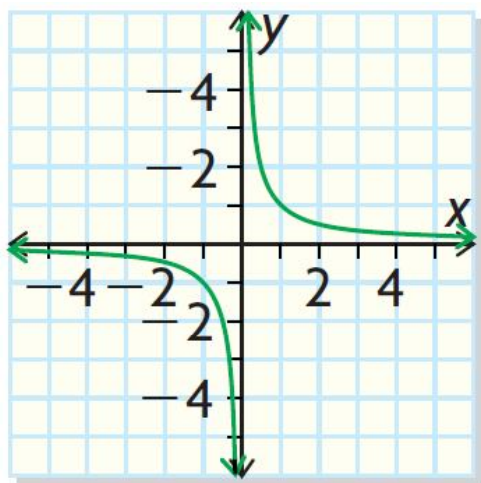
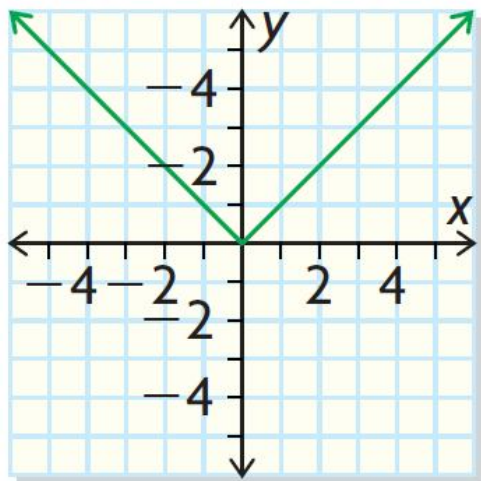


The 5 Parent Functions

- Parent functions are the base form or stripped down version of a type of function.

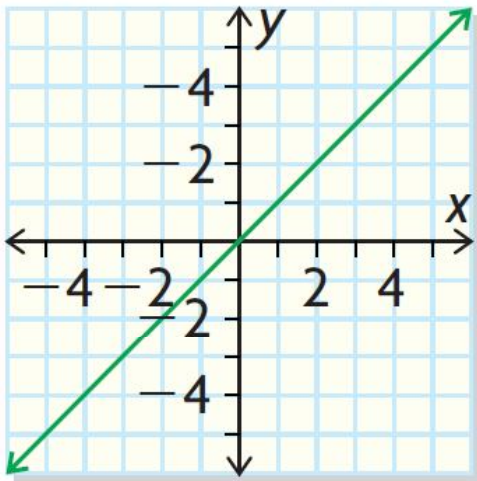


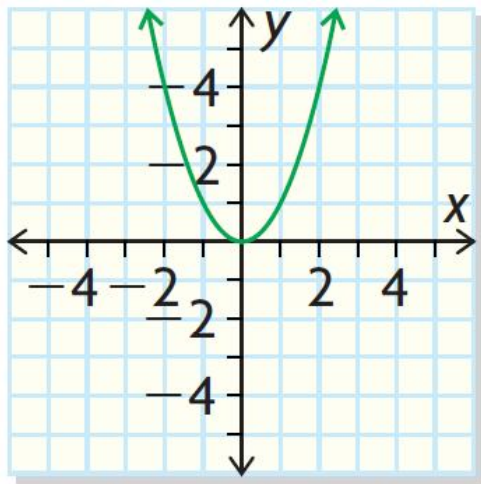




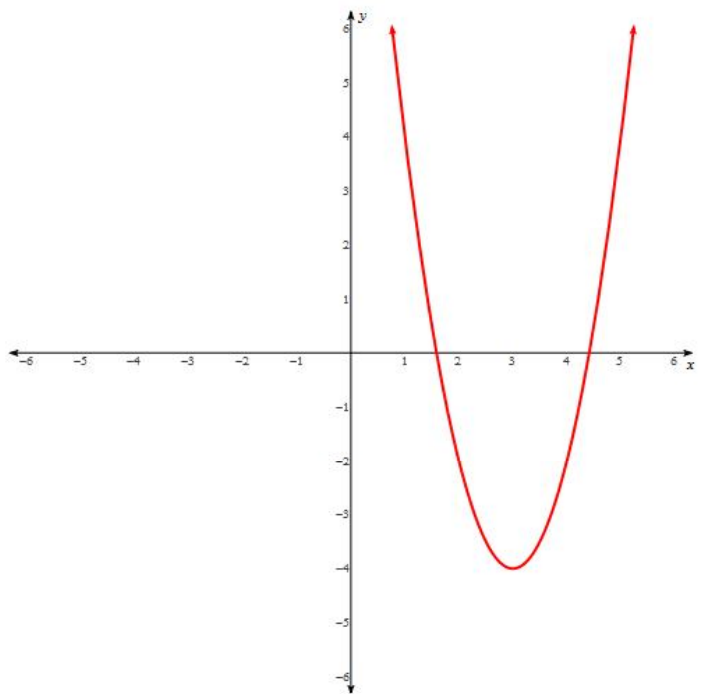
1.4 –Domain and Range Part 2

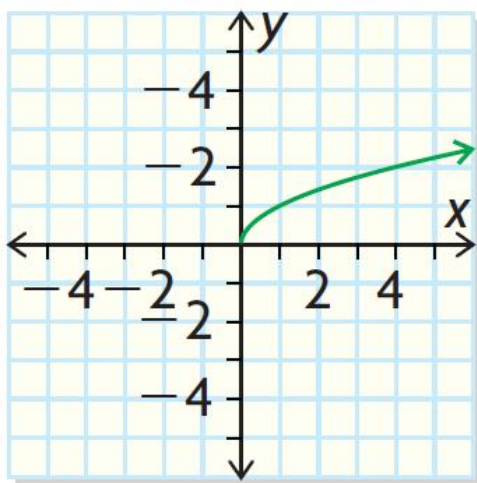
- Domain: the set of all possible x-values or inputs
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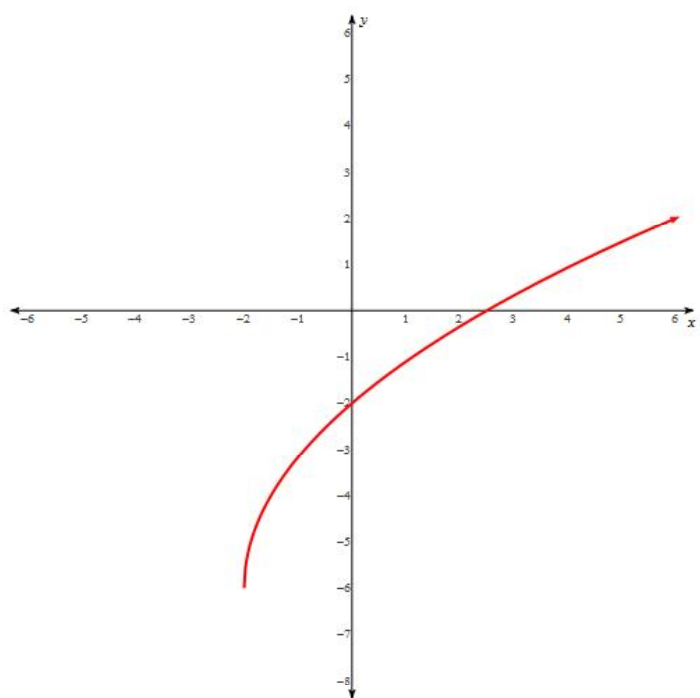


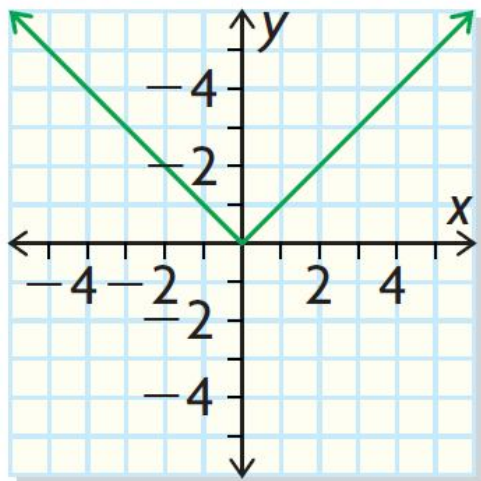
$$f(x) = 2(x - 3)^2 - 4$$



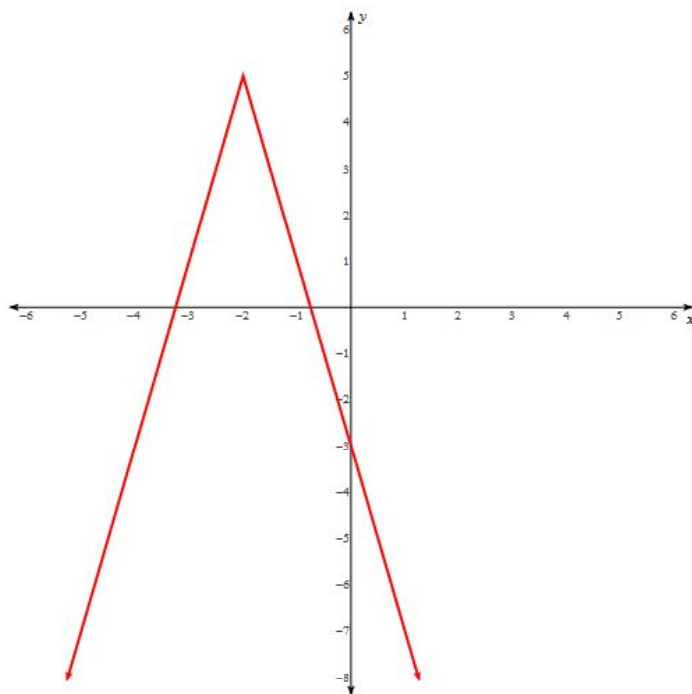


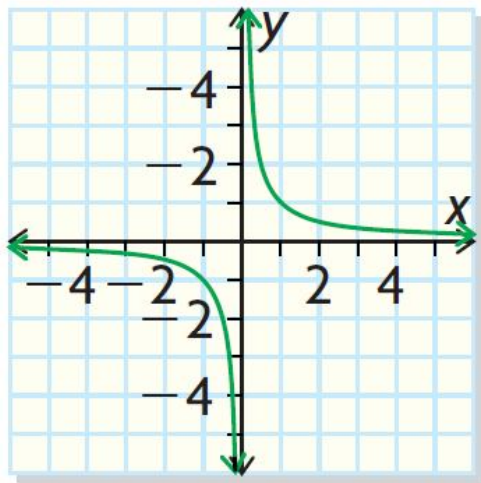
$$f(x) = 2\sqrt{2x+4} - 6$$



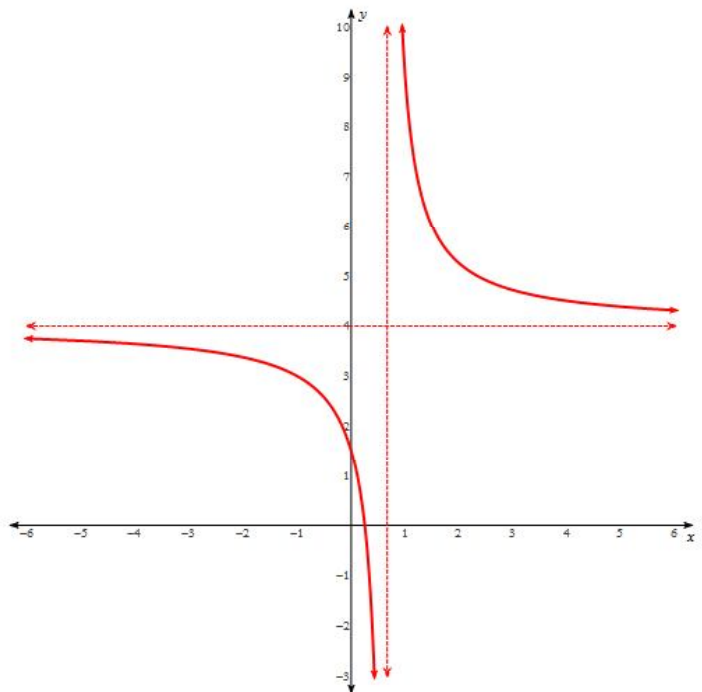


$$f(x) = -4|x + 2| + 5$$





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

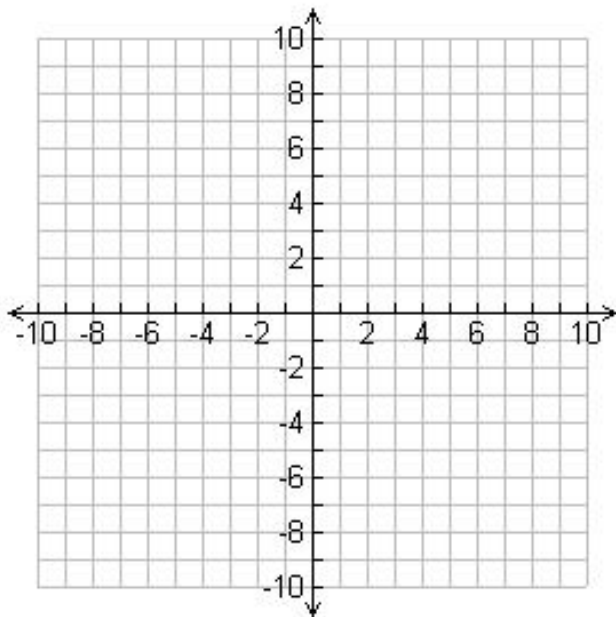


1.8 – Transformations of Parent Functions

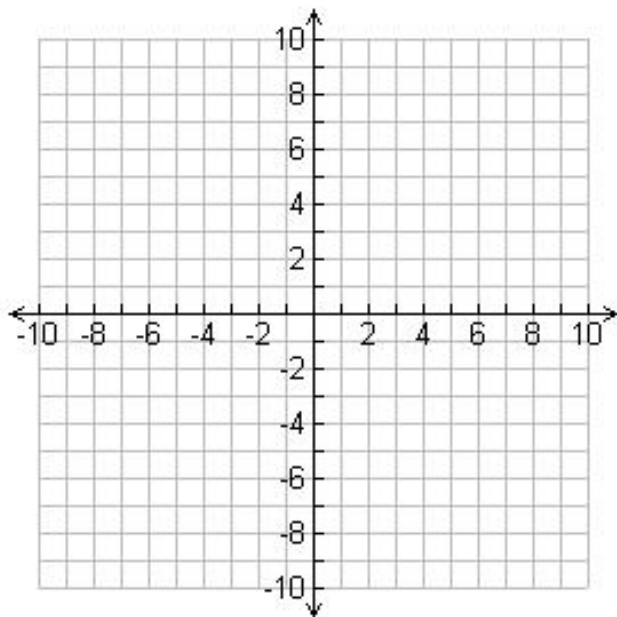
$$f(x) = af[k(x-d)] + c$$

- a = vertical stretch – multiply with $f(x)$ or y
- k = horizontal stretch – divide with x or multiply $1/k$ with x
- d = horizontal stretch – add/subtract with x (always do opposite)
- c = vertical shift – add/subtract with $f(x)$ or y
- Notes:
 - vertical is outside the “function” while horizontal is inside.
 - k must be factored to get d .

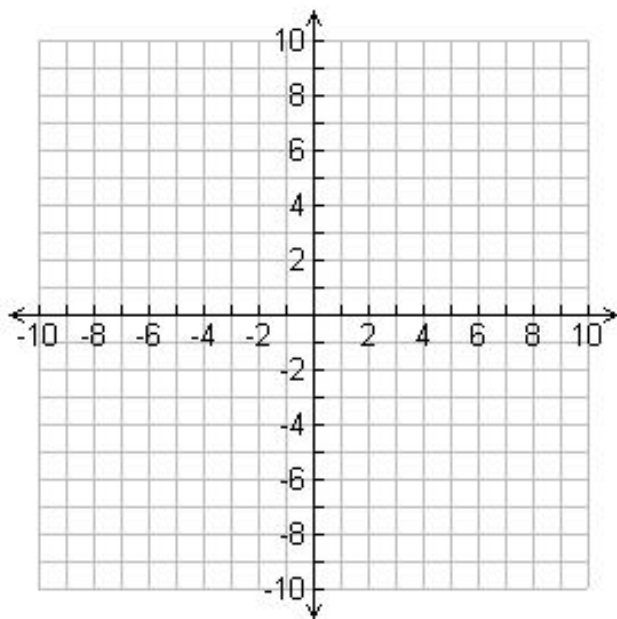
$$f(x) = 2(x-3)^2 - 4$$



$$f(x) = 2\sqrt{2x+4} - 6$$



$$f(x) = -4|x+2| + 5$$



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

