Title of Lesson:
Shifting, Reflecting, and Stretching Graphs

By the end of this lesson, I will be able to answer the following questions…

1. What is a **parent function**?

2. What is the algorithm for ***changing*** the graph of a parent function?

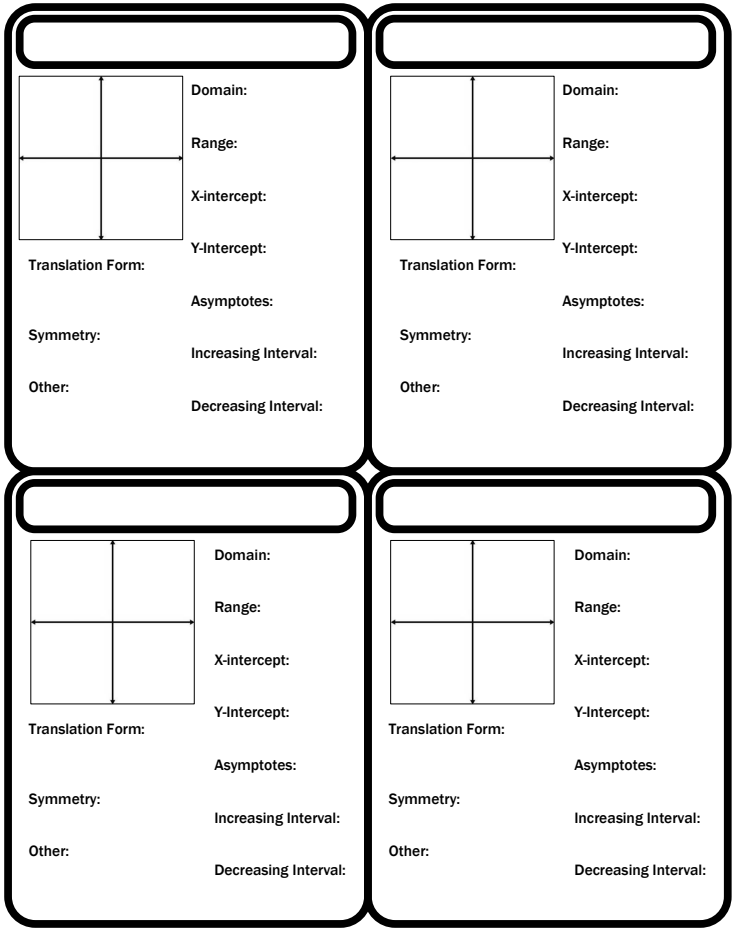
Vocabulary

1. **Parent Function:** A set of basic functions used as building blocks for more complicated functions.

2. **Graphical Transformations:** Any movement of a graph based on a **SHIFT**, **STRETCH**, **ROTATION** or **REFLECTION** - (Usually from a parent function.)

Prerequisite Skills with Practice

Introduce the Library of Functions sheet.

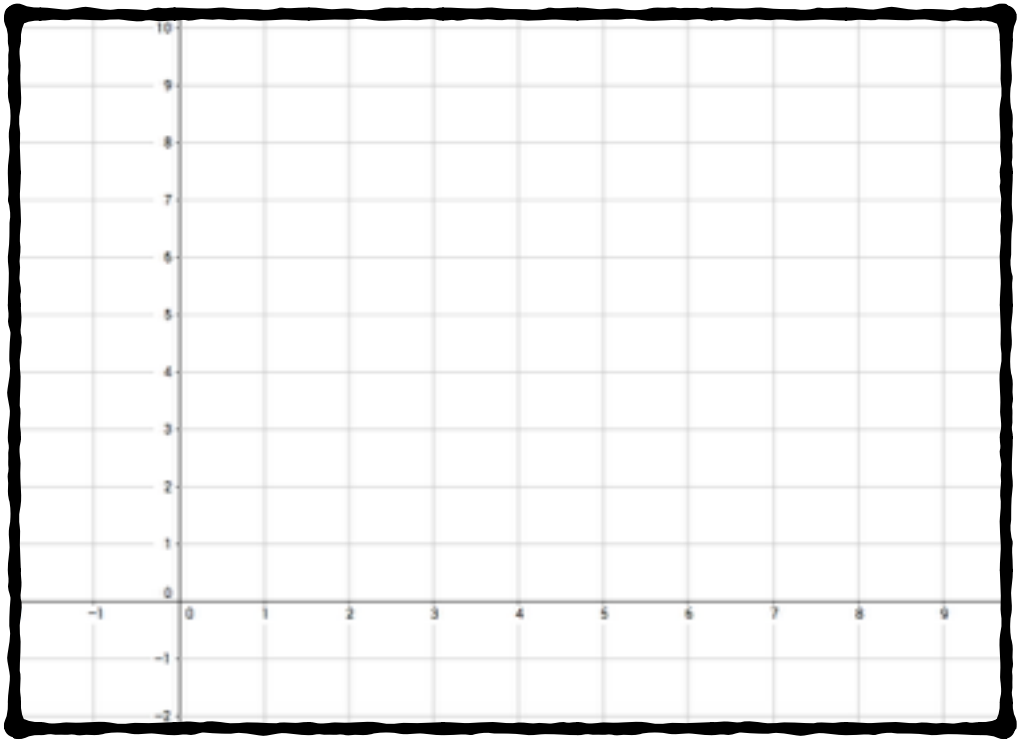


Graphing a **Parabola** using transformations from the parent function

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

$$f(x) = 2(x-4)^2 - 1$$

1. Parent
2. Multiplier
3. Shift

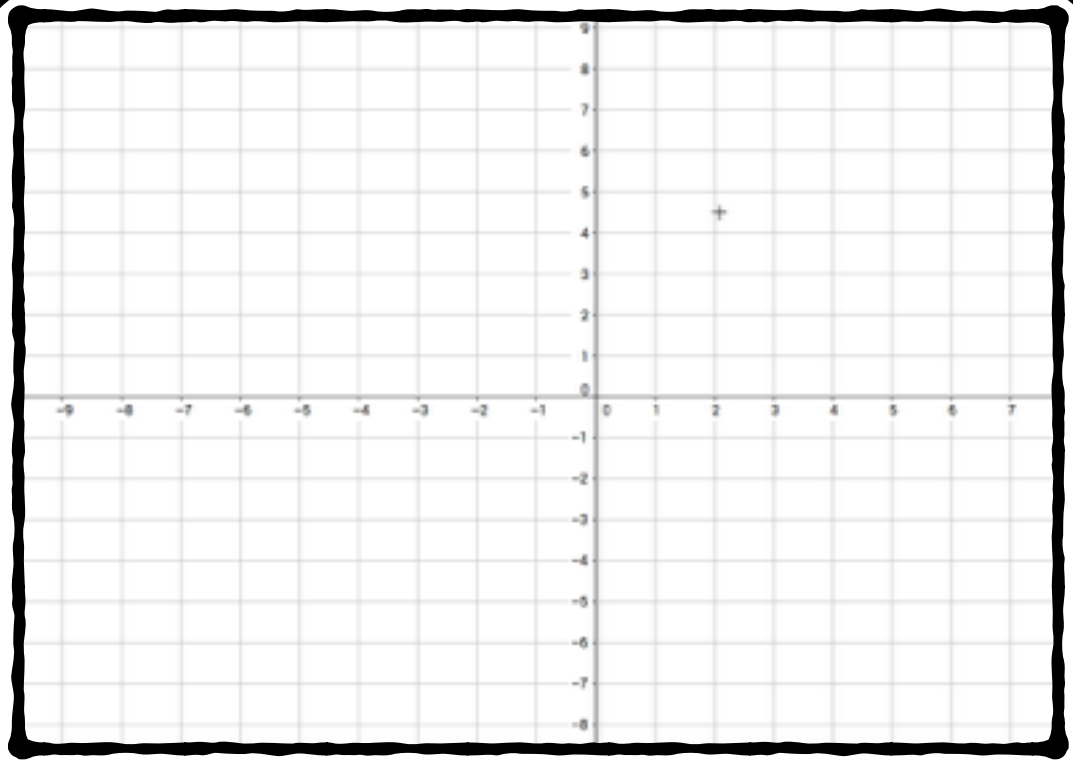


Graphing a **Parabola** using transformations from the parent function

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

$$f(x) = -\frac{1}{2}(x+3)^2$$

1. Parent
2. Multiplier
3. Shift

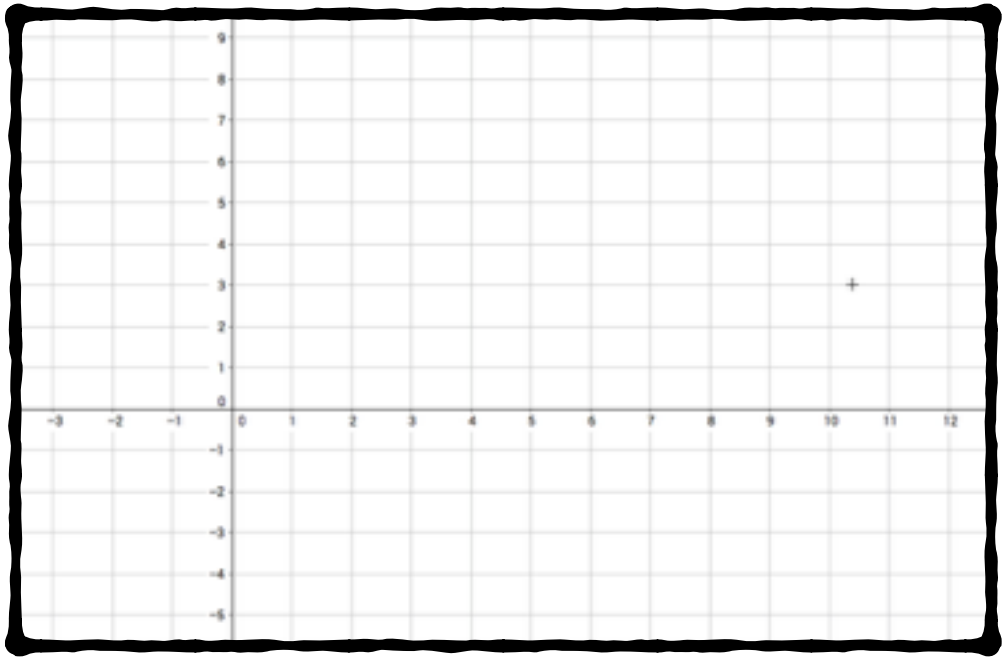


Graphing a **square root** function using transformations from the parent function

$$f(x) = a\sqrt{x-h} + k$$

$$f(x) = 3\sqrt{x+1} - 4$$

1. Parent
2. Multiplier
3. Shift

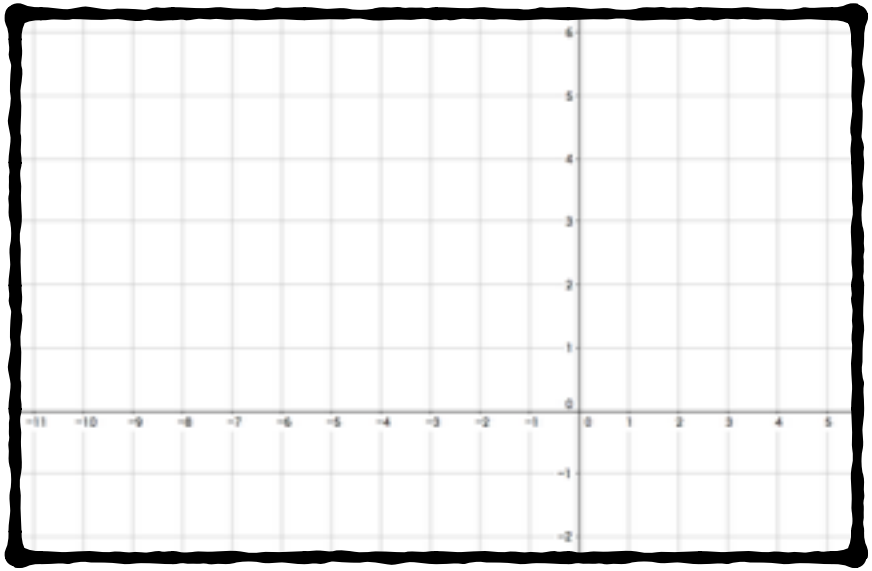


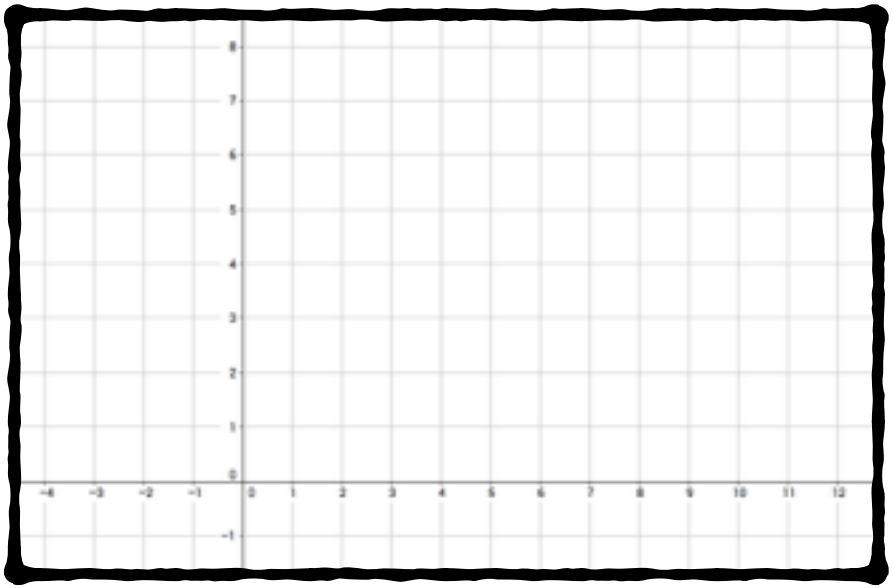
What happens when the algorithm doesn't match?

Use Strategic Values

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

$$f(x) = \sqrt{3x+8}+2$$



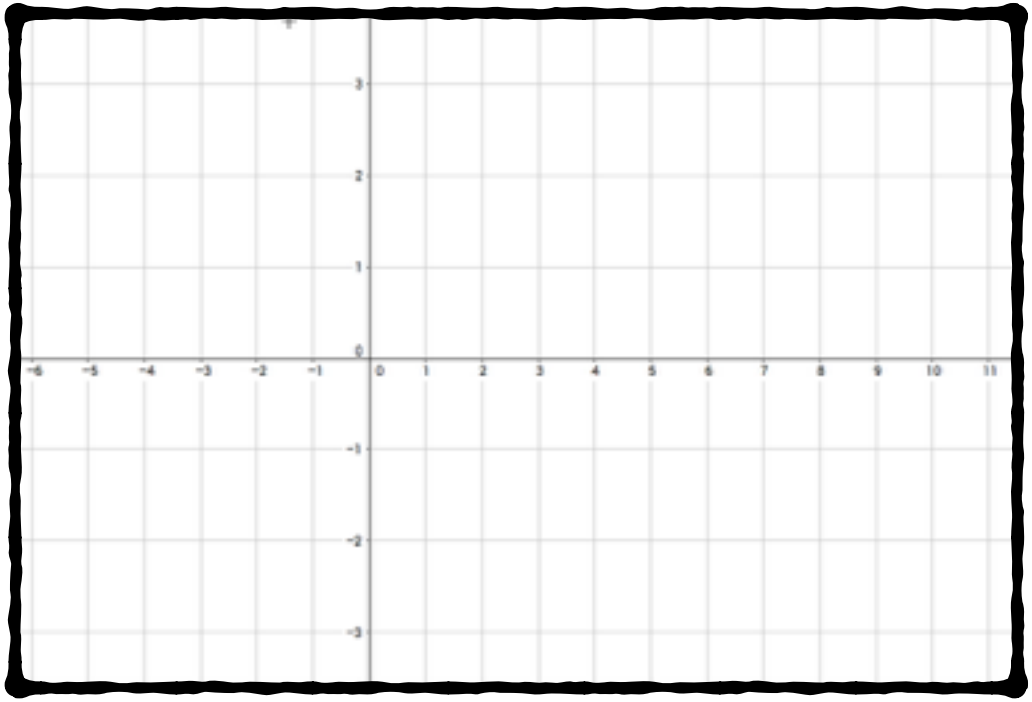


Graphing an **Absolute Value** function using transformations from the parent function

$$f(x) = a|x - h| + k$$

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

1. Parent
2. Multiplier
3. Shift

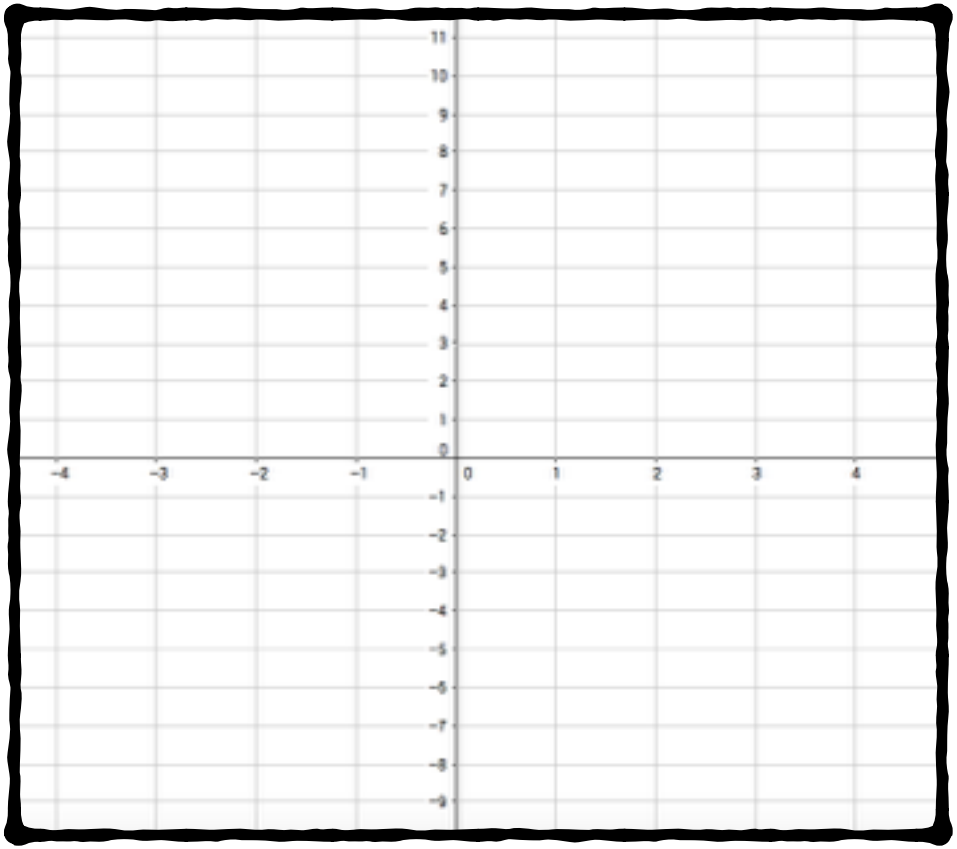


Graphing an **Cubic** function using transformations from the parent function

$$f(x) = a(x-h)^3 + k$$

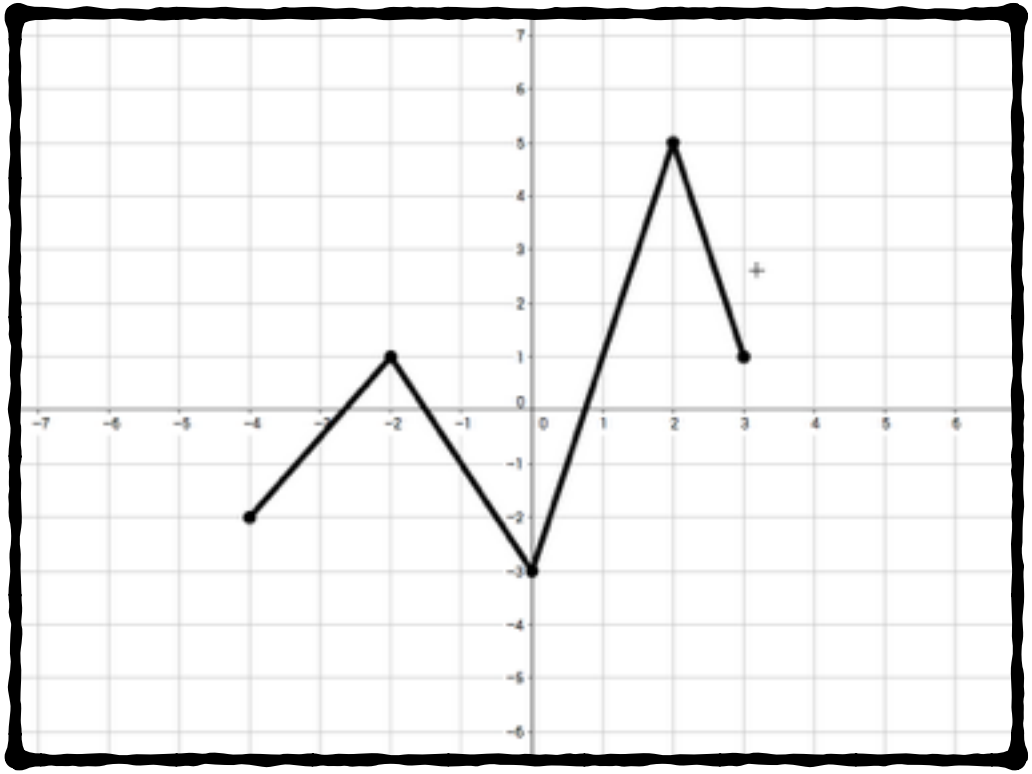
$$f(x) = -(x+1)^3 + 2$$

1. Parent
2. Multiplier
3. Shift



Transforming function using notation

(a) $y = f(-x)$
(b) $y = f(x) + 4$
(c) $y = 2f(x)$
(d) $y = -f(x - 4)$
(e) $y = f(x) - 3$
(f) $y = -f(x) - 1$
(g) $y = f(2x)$



THE END

Visit PlottsMath for assignment details