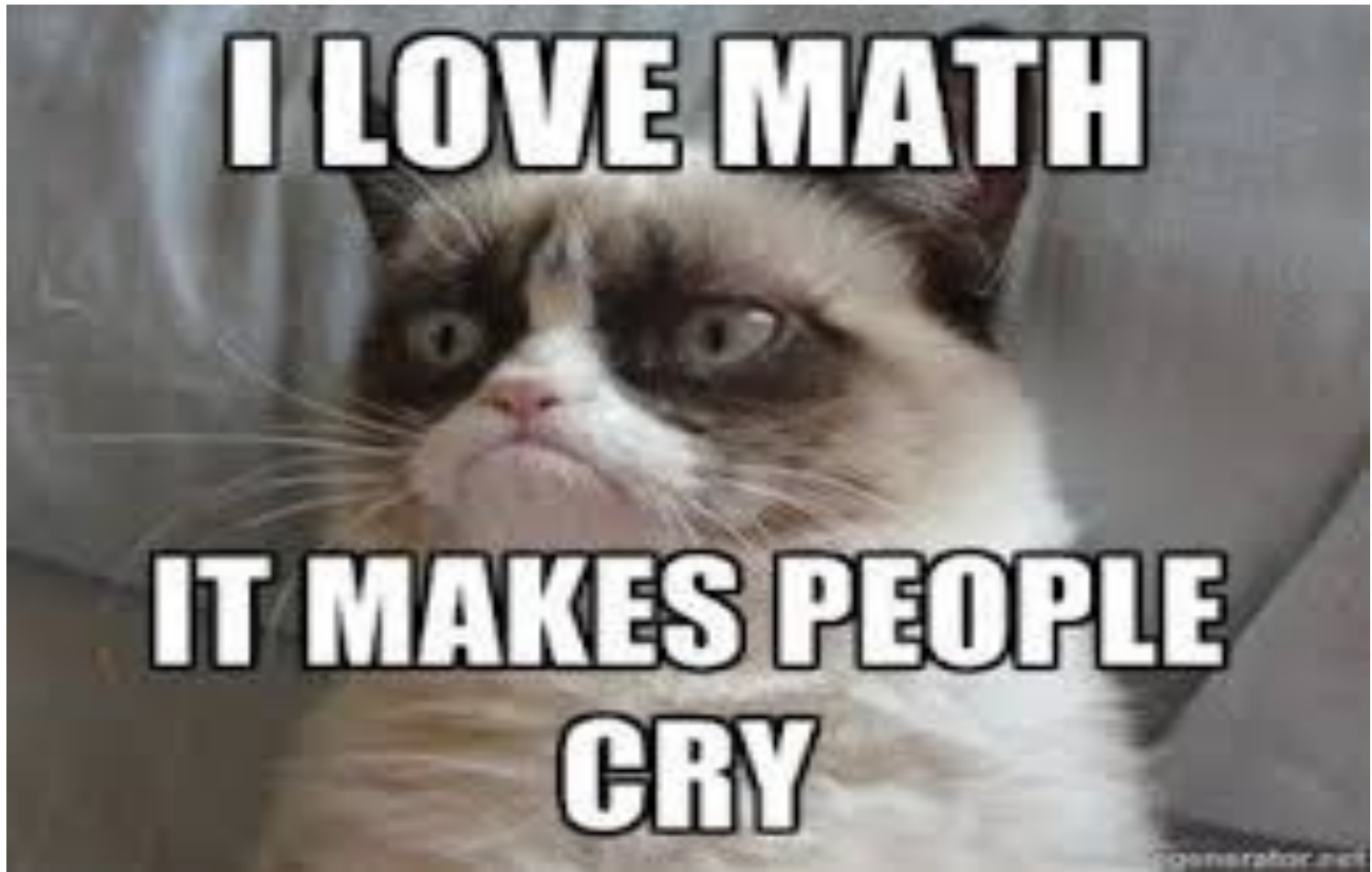# Lesson 2.1.2 PART B: Interpreting Various Forms of Quadratic Functions - *FACTORED FORM*

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

1. What are the advantages to the *Factored Form* of a quadratic equation?

2. How do I graph quadratic equations in *Factored Form*?

Vocabulary

1. Standard Form:

$$f(x) = Ax^2 + Bx + C$$
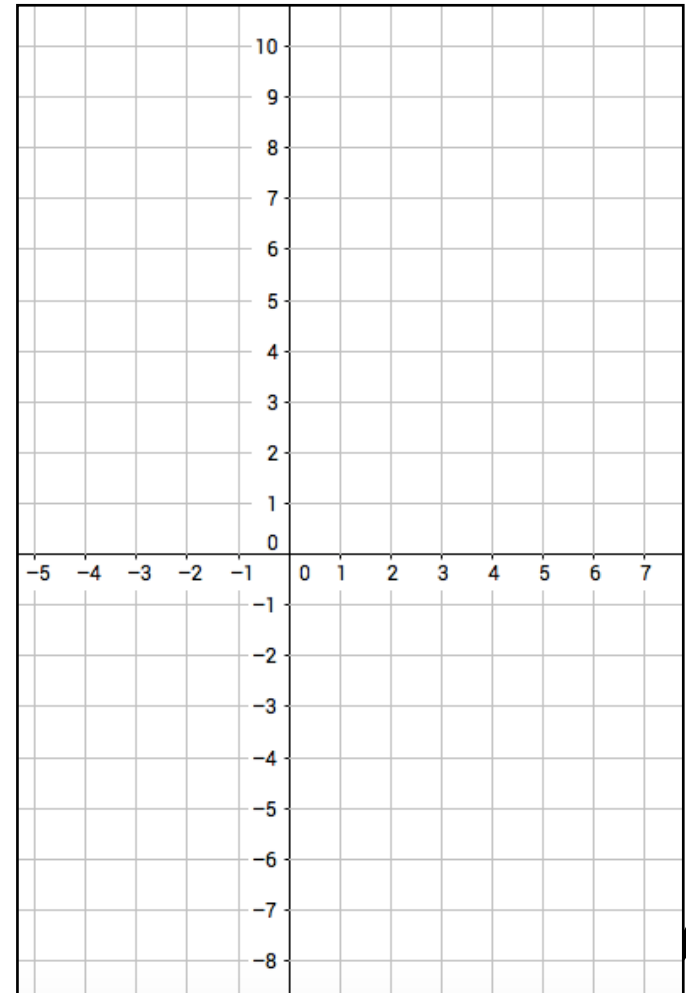
2. Vertex Form:

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

3. Factored Form:

$$f(x) = a(x - p)(x - q)$$

Prerequisite Skills with Practice

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

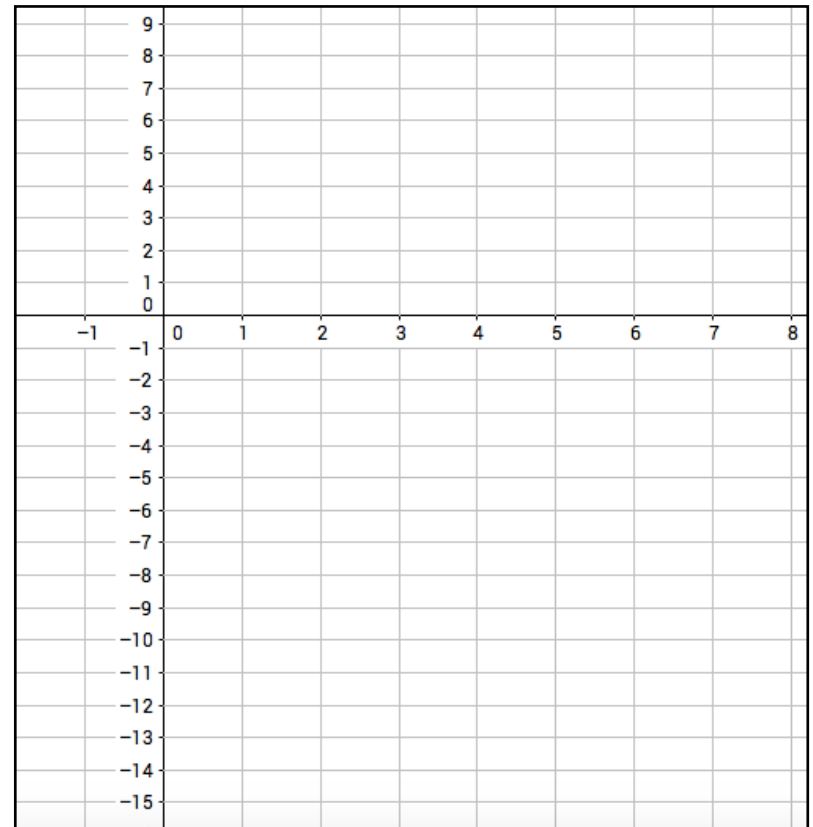| Input	Function	Output
0		
1		
2		
3		
4		
5		
6		
-1		
-2		
-3		

Example One

Graphing a parabola using it's x-intercepts, vertex, line of symmetry, Y-intercept

Steps:

1. Up or Down?
   - If *a* is Positive - UP
   - If *a* is Negative - DOWN
2. Find the x-intercepts
   - (x- p) = 0
   - (x- q) = 0
3. Find the vertex
   - Add the x - intercepts and divide by two to find the x value of the vertex.
   - Plug in that value to f(x) for the y value of the vertex.
4. Draw the line of symmetry.
   - x = x value of the vertex
5. Find the y-intercept.
   - Plug 0 in for x. Find other point using LOS.

$$f(x) = -2(x-5)(x-1)$$
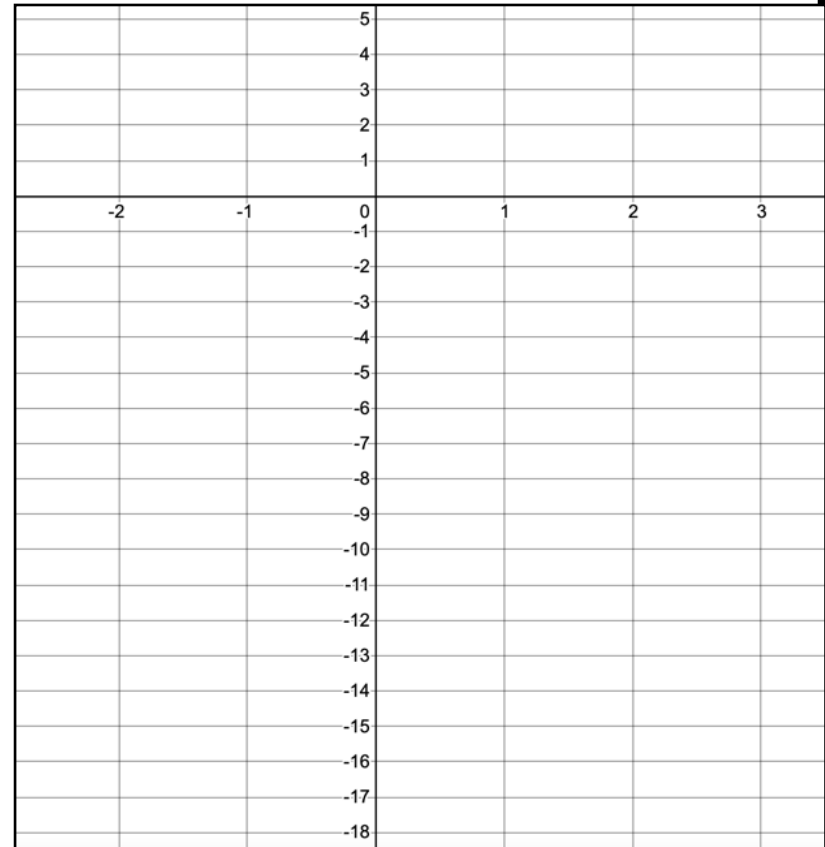$$f(x) = a(x-p)(x-q)$$

Example Two

Graphing a parabola using it's x-intercepts, vertex, line of symmetry, Y-intercept

Steps:

1. Up or Down?
   - If *a* is Positive - UP
   - If *a* is Negative - DOWN
2. Find the x-intercepts
   - (x- p) = 0
   - (x- q) = 0
3. Find the vertex
   - Add the x - intercepts and divide by two to find the x value of the vertex.
   - Plug in that value to f(x) for the y value of the vertex.
4. Draw the line of symmetry.
   - x = x value of the vertex
5. Find the y-intercept.
   - Plug 0 in for x. Find other point using LOS.

$$f(x) = (2x - 5)(2x + 3)$$

$$f(x) = a(x - p)(x - q)$$

Graphing a parabola using it's x-intercepts, vertex, line of symmetry, Y-intercept

Steps:

1. Up or Down?
   - If *a* is Positive - UP
   - If *a* is Negative - DOWN
2. Find the x-intercepts
   - (x- p) = 0
   - (x- q) = 0
3. Find the vertex
   - Add the x - intercepts and divide by two to find the x value of the vertex.
   - Plug in that value to f(x) for the y value of the vertex.
4. Draw the line of symmetry.
   - x = x value of the vertex
5. Find the y-intercept.
   - Plug 0 in for x. Find other point using LOS.

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

$$f(x) = a(x - p)(x - q)$$
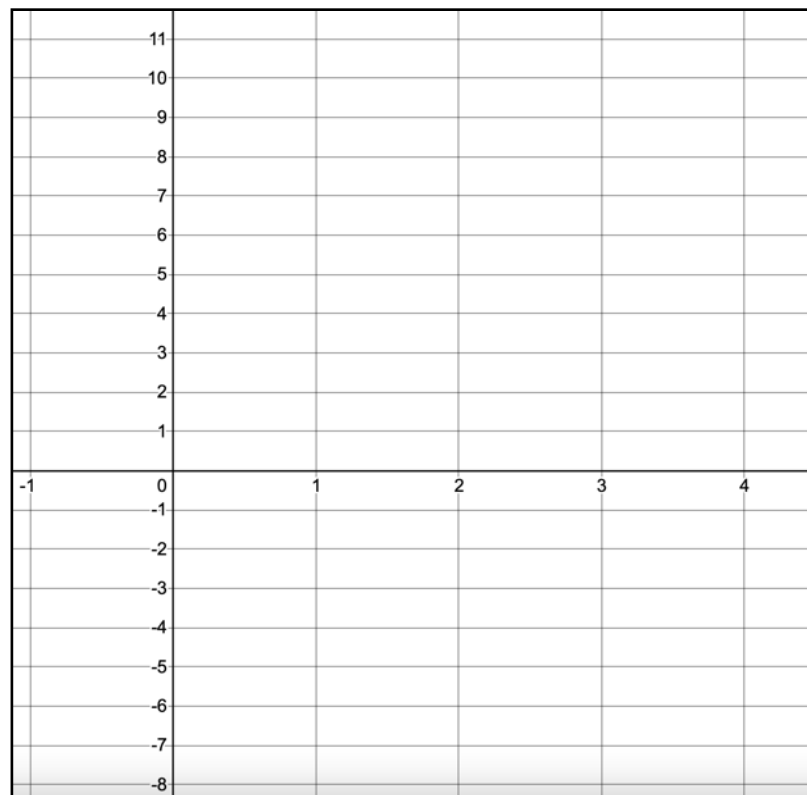
Example Four

Apply the Factored Form

Suppose that the flight of a launched bottle rocket can be modeled by the function $f(x) = -(x - 1)(x - 6)$, where $f(x)$ measures the height above the ground in meters and x represents the horizontal distance in meters from the launching spot at $x = 1$. How far does the bottle rocket travel in the horizontal direction from launch to landing? What is the maximum height the bottle rocket reaches? How far has the bottle rocket traveled horizontally when it reaches its maximum height?
Graph the function.

THE END

Visit PlottsMath for assignment details