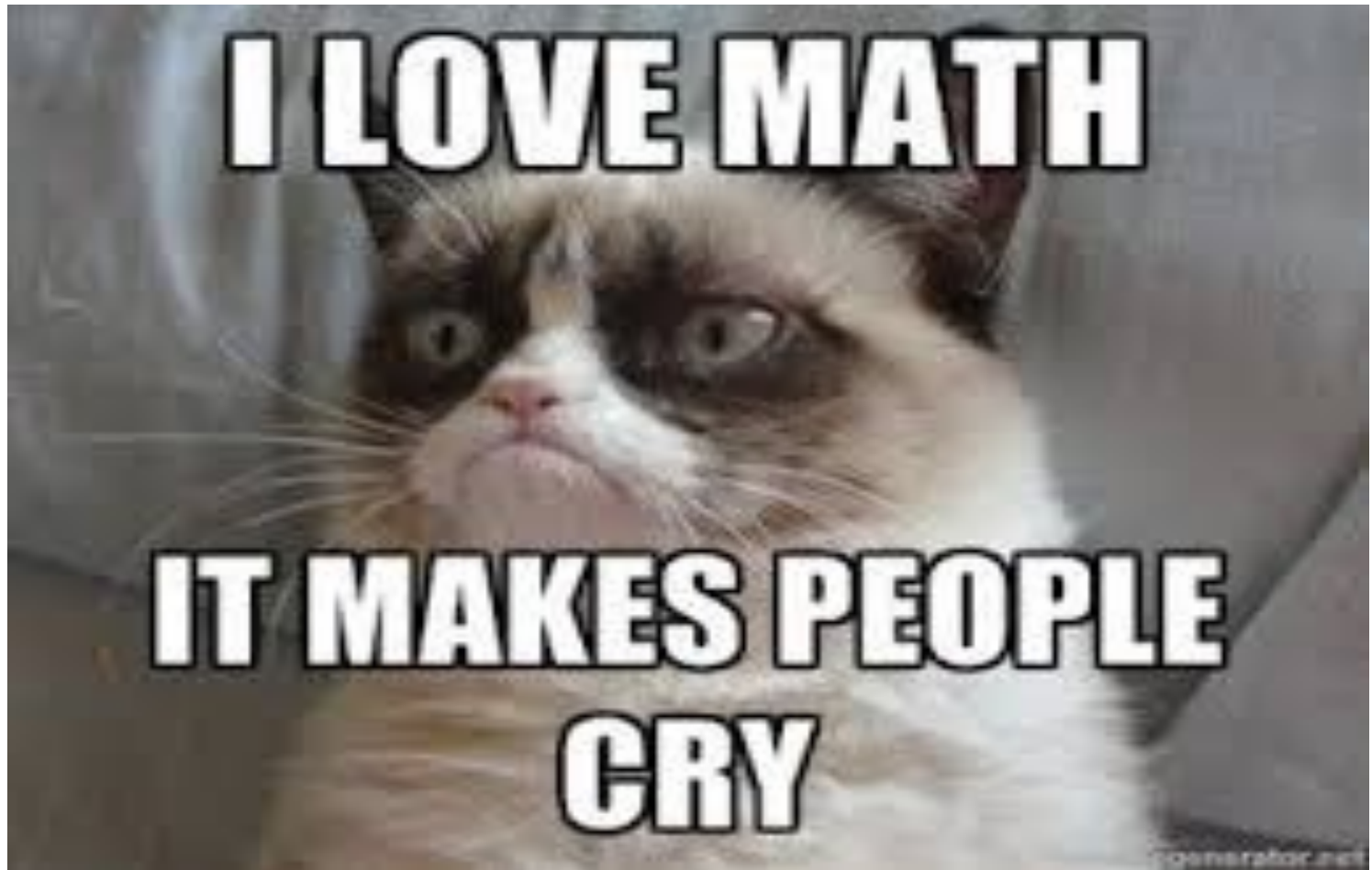


Lesson 2.1.2 PART B: Interpreting Various Forms  
of Quadratic Functions - *FACTORED FORM*



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:

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

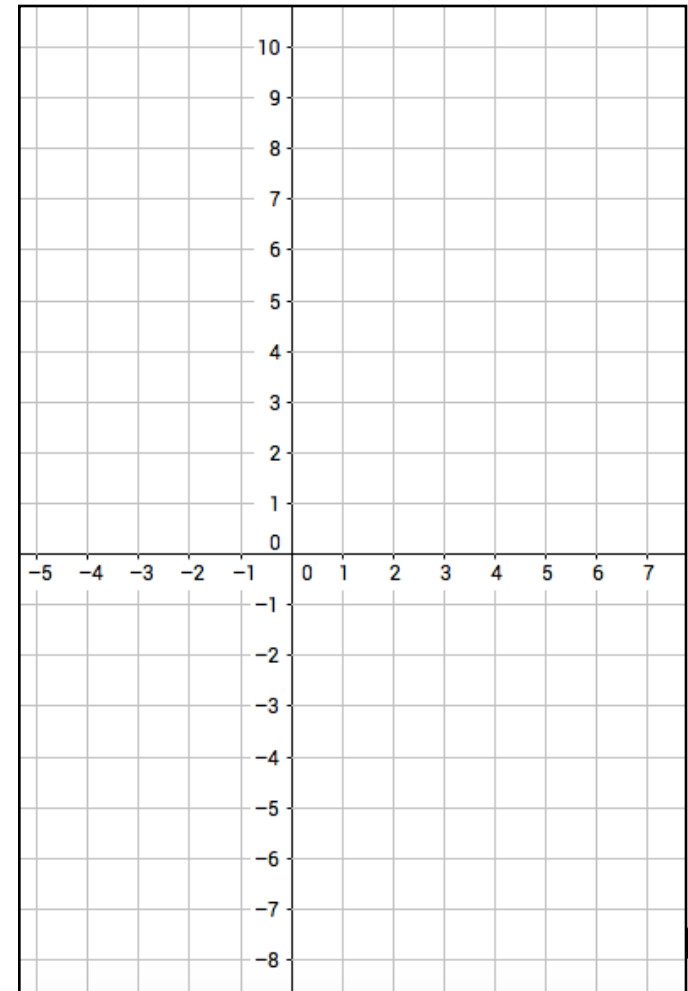
3. Factored Form:

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

# 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

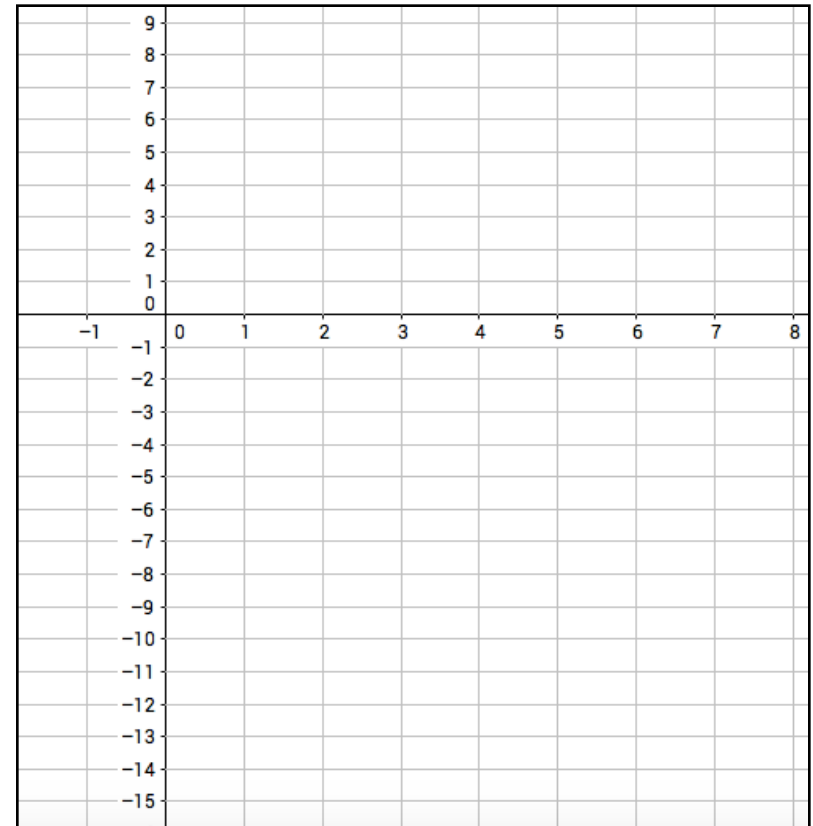
Graphing a parabola using it's  
x-intercepts, vertex, line of  
symmetry, Y-intercept

Steps:

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

$$f(x) = -2(x - 5)(x - 1)$$

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



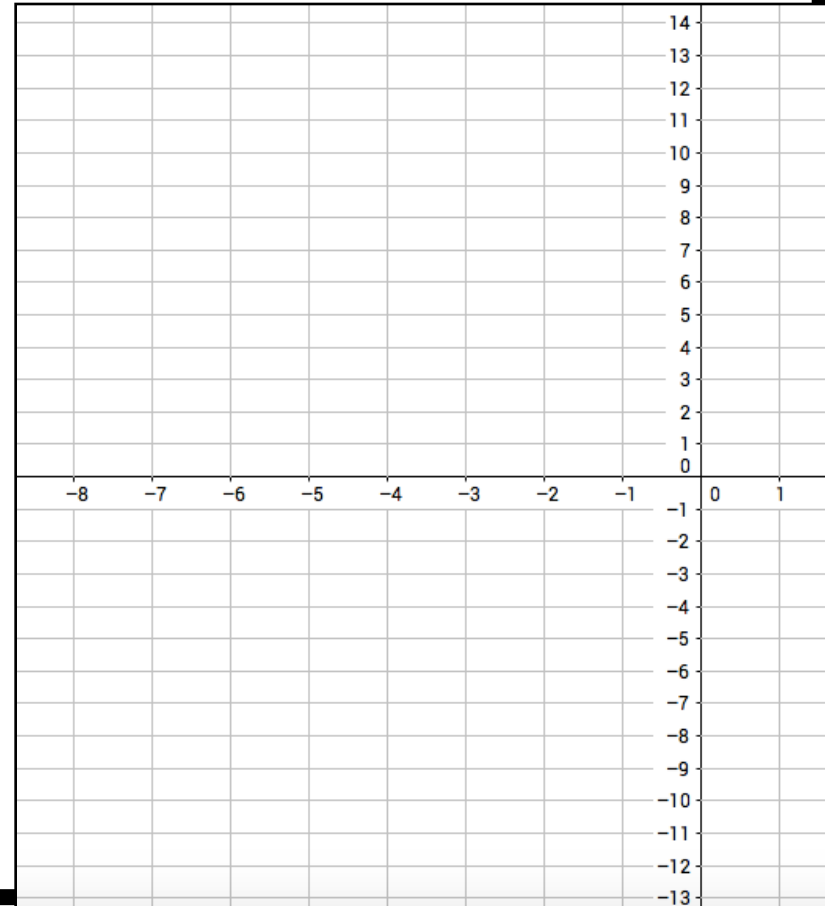
## Example Two

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
  - (opposite of  $p$ , 0)
  - (opposite of  $q$ , 0)
3. Find the vertex
  - Add opposite  $p +$  opposite  $q$   
then divide by 2 for the  $x$   
value.
  - Plug in that value to  $f(x)$  for  
the  $y$  value.
3. Draw the line of symmetry.
  - $x = x$  value of the vertex
4. Find the  $y$ -intercept.
  - Plug 0 in for  $x$ . Find other  
point using LOS.

$$f(x) = x(x + 7)$$
$$f(x) = a(x - p)(x - q)$$



### Example Three

#### *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



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