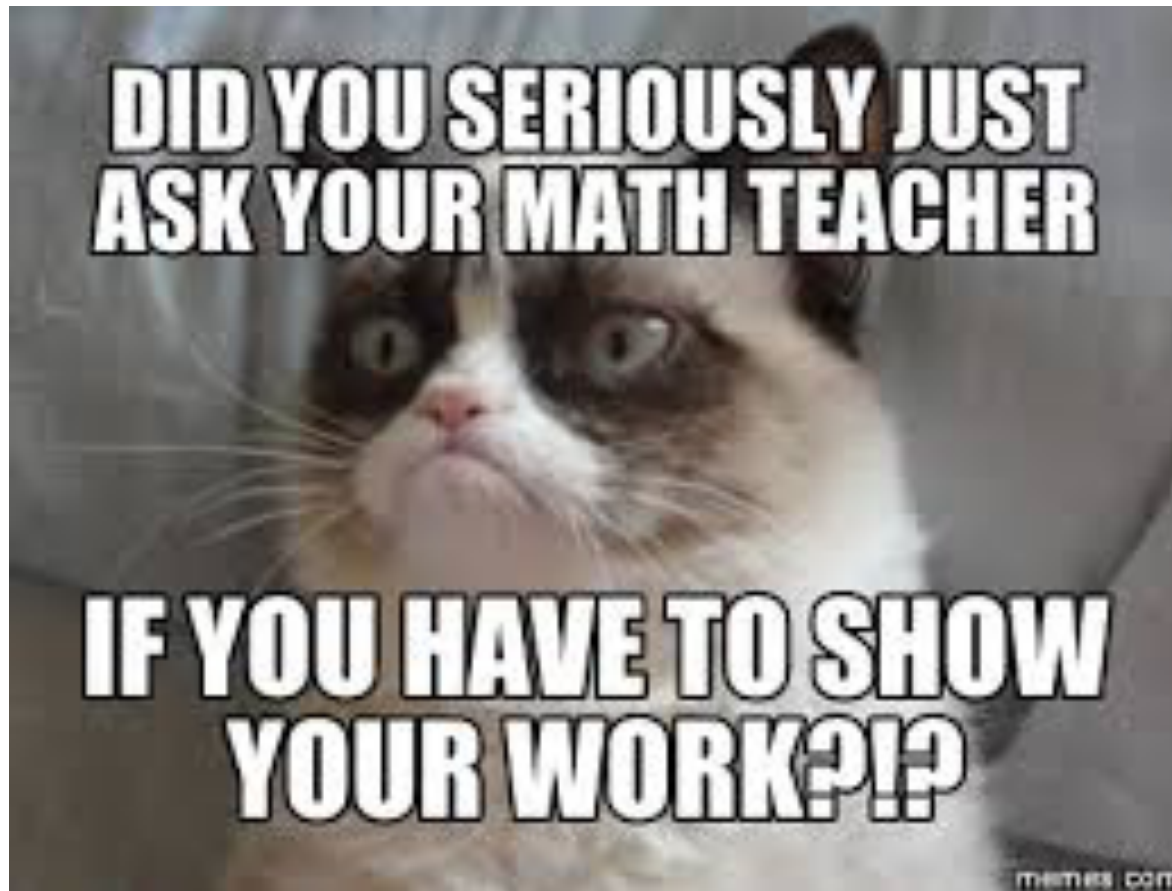


Lesson 2.1.2 PART A: Interpreting Various  
Forms of Quadratic Functions - *VERTEX FORM*



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

1. What are the advantages to the *Vertex Form* of a quadratic equation?
2. How do I graph quadratic equations in *Vertex Form*?

# Vocabulary

1. Standard Form:

$$f(x) = Ax^2 + Bx + C$$

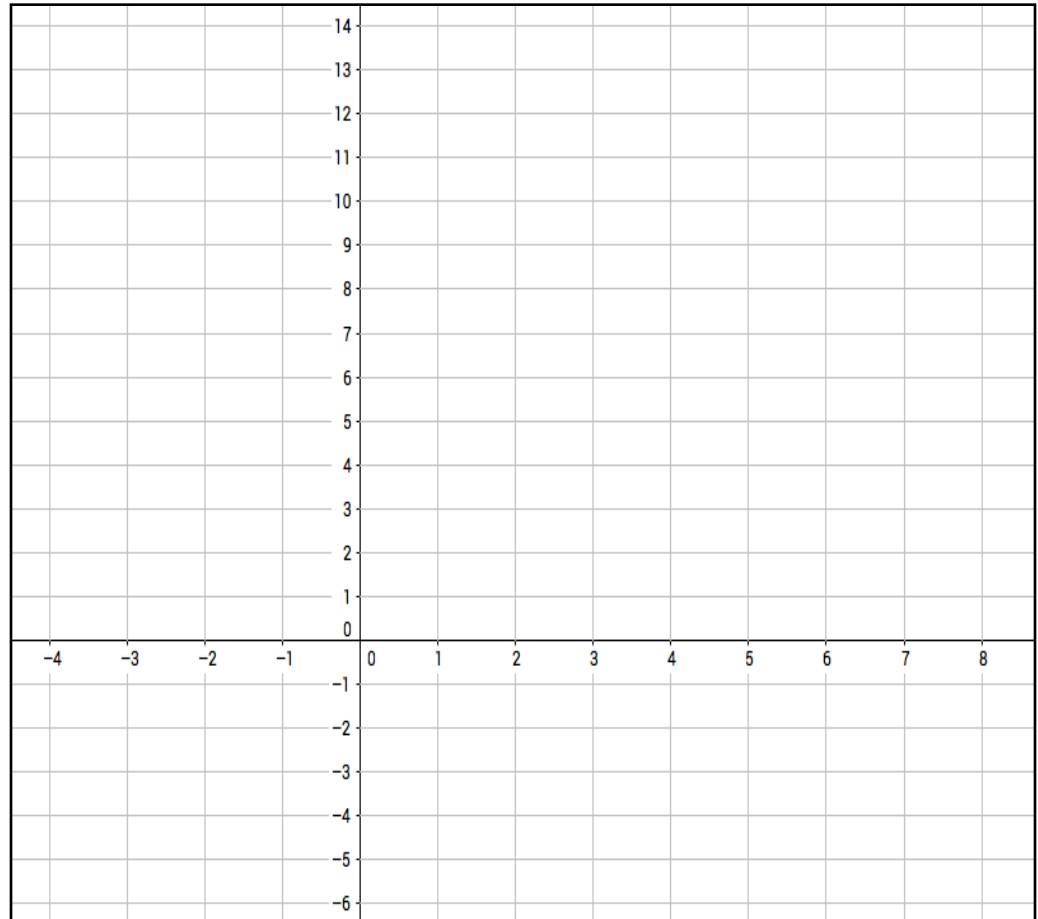
2. Vertex Form:

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

# Prerequisite Skills with Practice

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

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



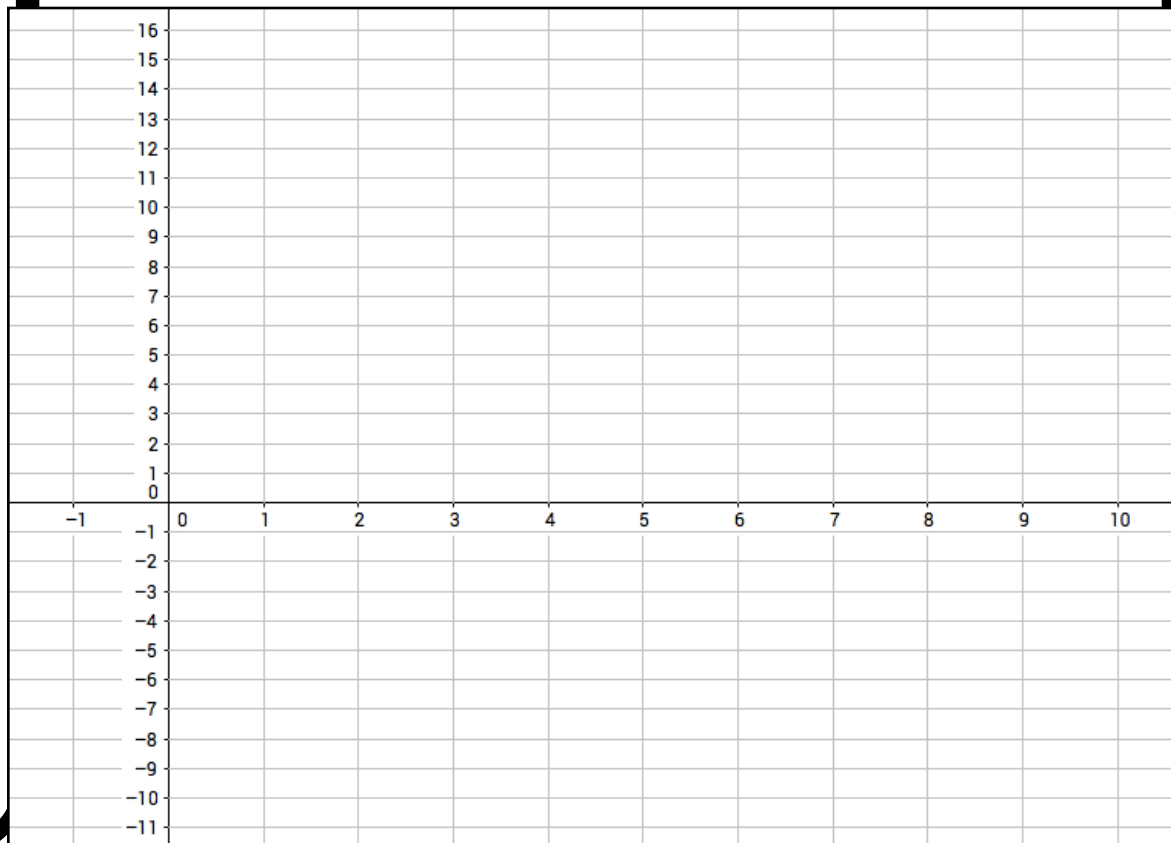
### Example One

Graphing a parabola using it's vertex, line of symmetry, Y-intercept and strategic points.

Steps:

1. Up or Down?
  - If  $a$  is Positive - UP
  - If  $a$  is Negative - DOWN
2. Find the vertex.
  - X-value is the **opposite** of  $h$
  - Y-value is  $k$
3. Draw the line of symmetry.
  - $x = x$  value of the vertex
4. Find the y-intercept.
  - Plug 0 in for  $x$ .
5. Use strategic points.
  - Nice  $x$  values on both sides of the line of symmetry

$$f(x) = (x - 4)^2 - 10$$
$$f(x) = a(x - h)^2 + k$$



## Example Two

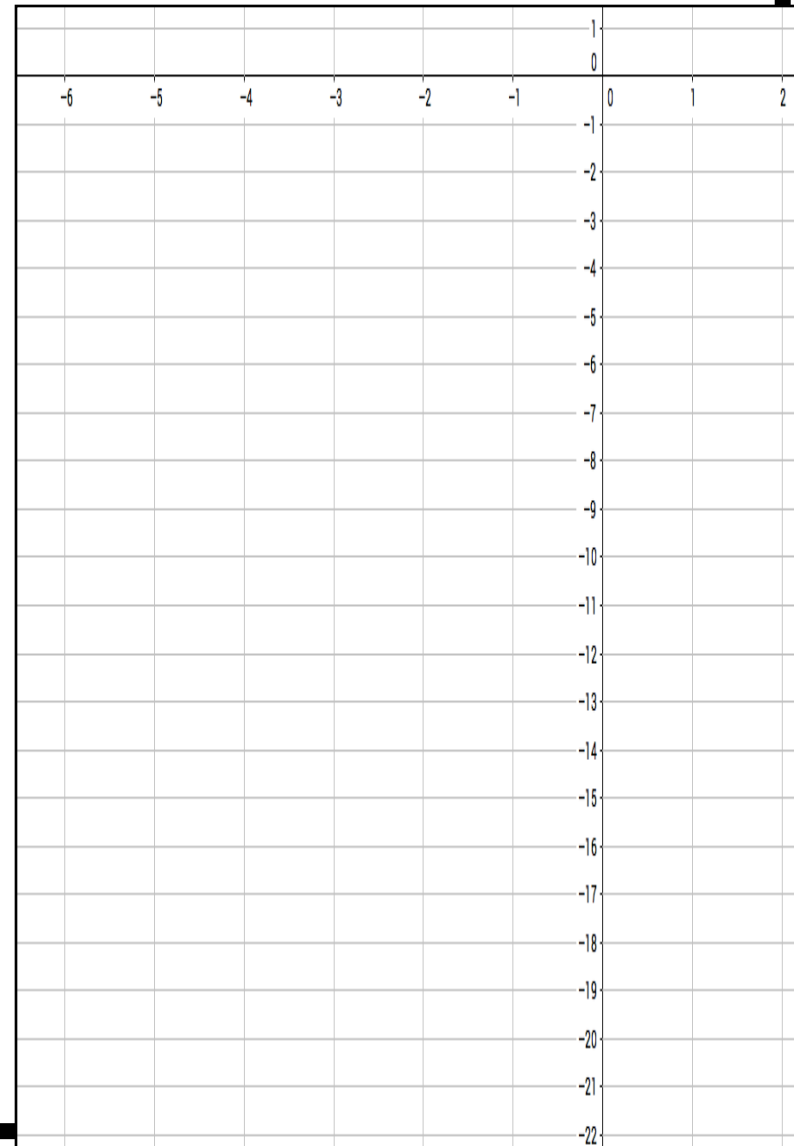
Graphing a parabola using it's vertex, line of symmetry, Y-intercept and strategic points.

Steps:

1. Up or Down?
  - If  $a$  is Positive - UP
  - If  $a$  is Negative - DOWN
2. Find the vertex.
  - X-value is the **opposite** of  $h$
  - Y-value is  $k$
3. Draw the line of symmetry.
  - $x = x$  value of the vertex
4. Find the y-intercept.
  - Plug 0 in for  $x$ .
5. Use strategic points.
  - Nice  $x$  values on both sides of the line of symmetry

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

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



### Example Three

*Apply the Vertex Form*

Reducing the cost of an item can result in a greater number of sales. The revenue function that predicts the revenue in dollars,  $R(x)$ , for each \$1 change in price,  $x$ , for a particular item is  $R(x) = -100(x - 7)^2 + 28900$

What is the maximum value of the function? What does the maximum value mean in the context of the problem? What price increase maximizes the revenue and what does it mean in the context of the problem? Graph the function.

# THE END



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