

# Unit 1 Lesson 1

## Graphing Quadratics in Standard Form

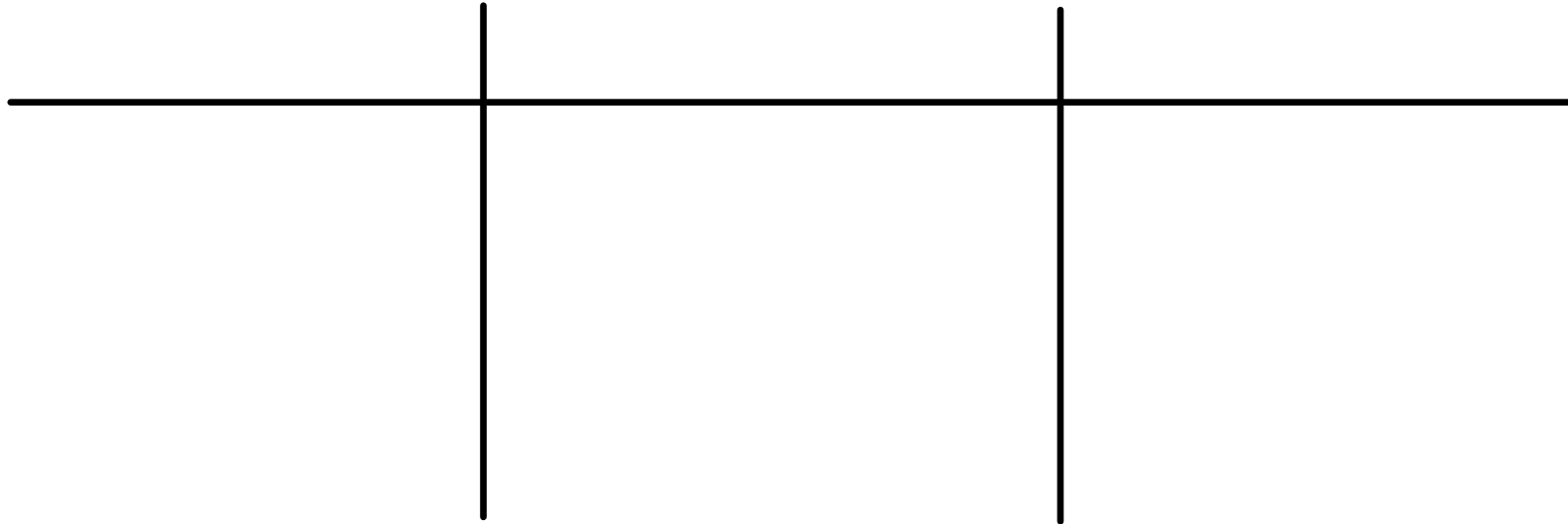
Quadratic equations can be written in **standard form**:

$$y = ax^2 + bx + c$$

There are no \_\_\_\_\_ in standard form.

$$\text{Standard Form: } y = ax^2 + bx + c$$

Examples:

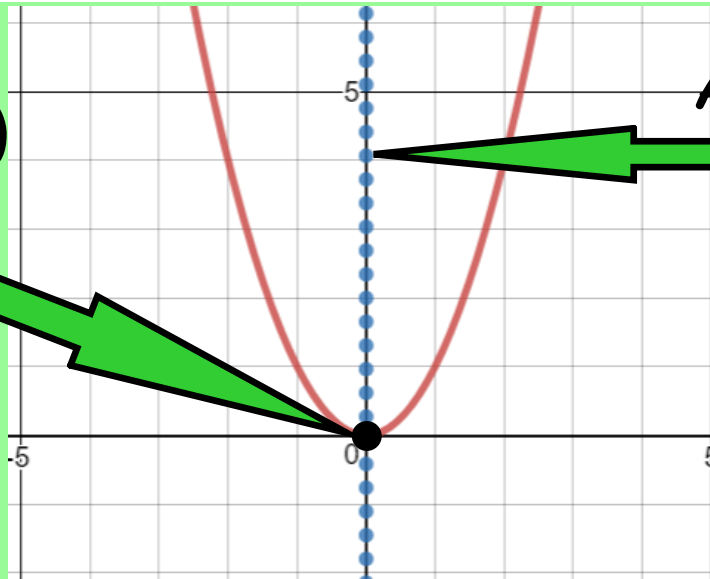


Graphing Quadratics in Standard Form

Vertex-  $(x, y)$

or

on the parabola



Axis of Symmetry

Vertical line that divides the parabola into

and goes through the

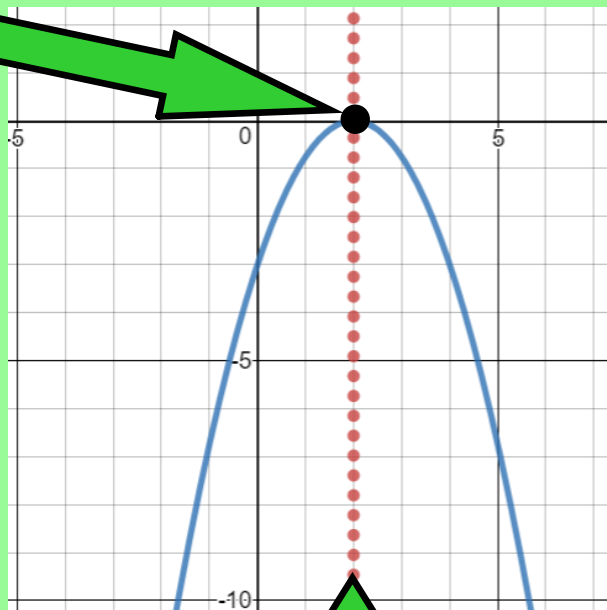
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## Graphing Quadratics in Standard Form

**Vertex-  $(x, y)$**

Highest point

\_\_\_\_\_

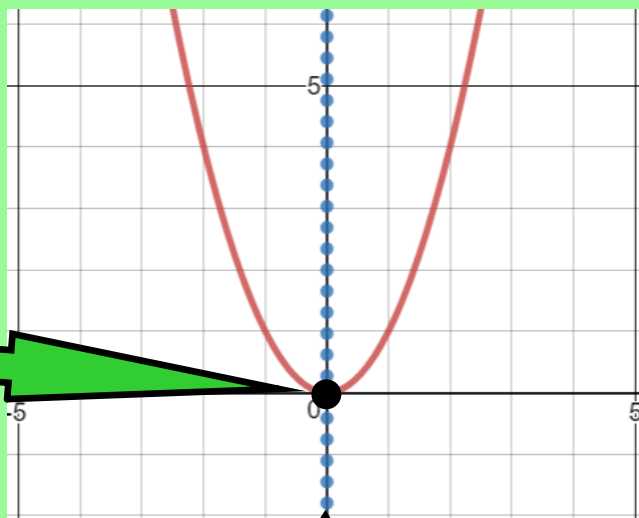


Axis of Symmetry: \_\_\_\_\_

## Graph of Quadratic parent function

$$f(x) = x^2$$

Vertex: \_\_\_\_\_



Axis of Symmetry: \_\_\_\_\_

We can use the **standard form** of a quadratic equation to find the **vertex**, **axis of symmetry**, and **y-intercept** of any parabola.

$$\text{Standard Form: } y = ax^2 + bx + c$$

**Vertex:**

**Axis of  
symmetry:**

**y-intercept:**

**Example:** Graph a function in the form  $y = ax^2 + bx + c$

**Graph:**  $y = 2x^2 - 8x + 6$

a =	___
b =	___
c =	___

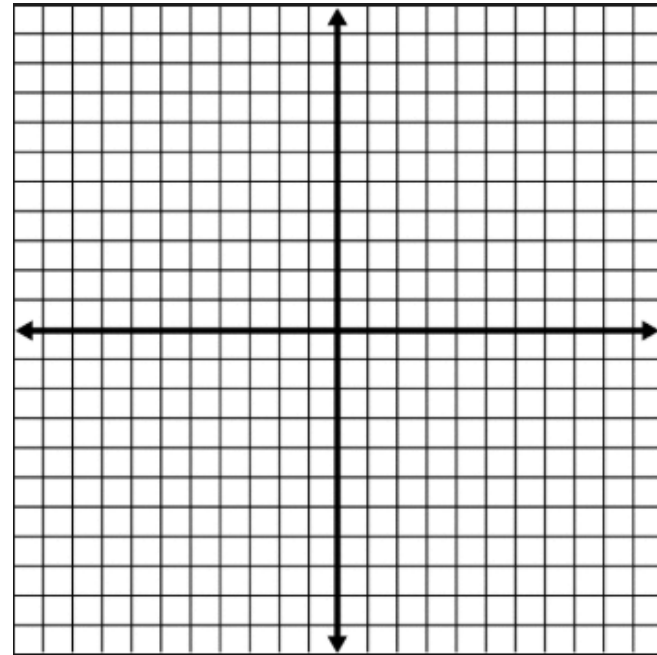
Vertex:  $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$

$$x = \frac{-b}{2a}$$

$$y = f\left(\frac{-b}{2a}\right)$$

**Axis of Symmetry:**

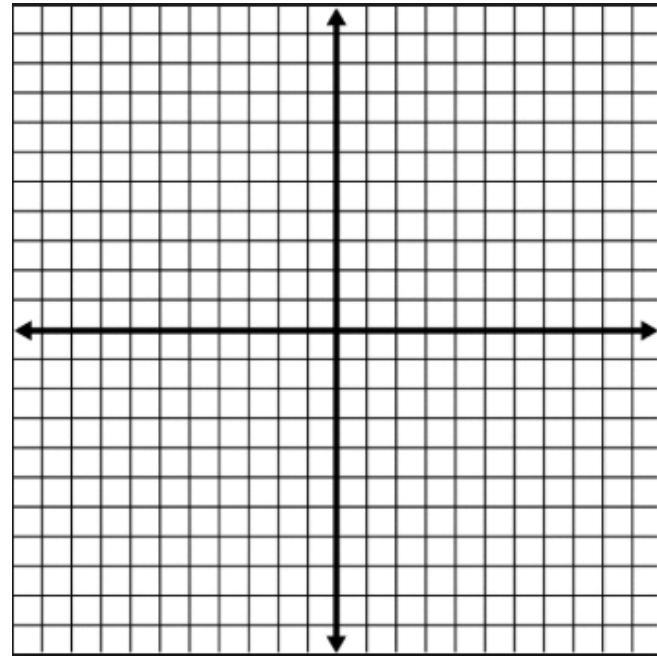
**y-intercept:**



Graphing Quadratics in Standard Form

Practice: Graph the function. Label the vertex and axis of symmetry.

$$y = x^2 - 2x - 1$$

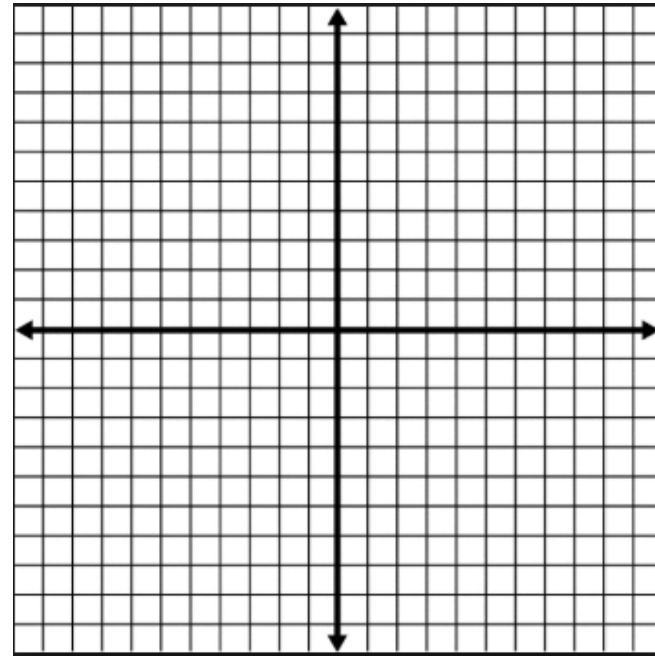




Graphing Quadratics in Standard Form

Practice: Graph the function. Label the vertex and axis of symmetry.

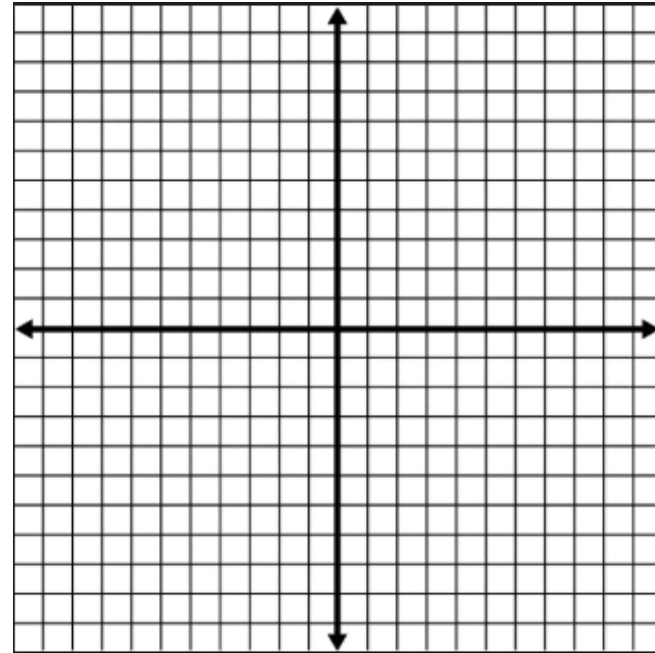
$$y = 2x^2 + 6x + 3$$



Graphing Quadratics in Standard Form

Practice: Graph the function. Label the vertex and axis of symmetry.

$$y = -\frac{1}{2}x^2 + 4x - 3$$



Finding the minimum or maximum  
value of a quadratic function.

If  $a > 0$ , the parabola opens \_\_\_\_\_ and there will be a \_\_\_\_\_ value.

If  $a < 0$ , the parabola opens \_\_\_\_\_ and there will be a \_\_\_\_\_ value.

## Graphing Quadratics in Standard Form

### Example:

Tell whether the function  $y = 3x^2 - 18x + 20$  has a minimum value or a maximum value. Then find the minimum or maximum value.

Graphing Quadratics in Standard Form

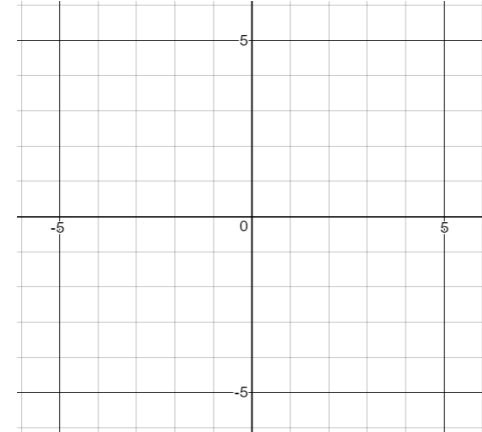
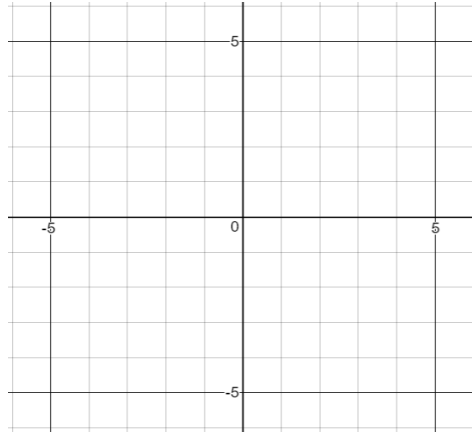
Practice: Find the minimum value of  $y = 4x^2 + 16x - 3$ .

## Graphing Quadratics in Standard Form

### Practice:

1. Graph  $y = -\frac{2}{3}x^2 + 6$ . Compare it with the graph of  $y = x^2$ .

2. Graph  $y = x^2 - 2x - 3$ .



3. Tell whether the function  $y = x^2 - 6x + 4$  has a maximum or minimum value. Then, find the maximum or minimum value.

# **ASSIGNMENT:**

Lesson 1.1 **Practice B** Worksheet

1 - 9 (all)

10 - 20 (even)

22 - 24 (all)

**You may use a calculator for #3, 4, 5, 6, 12, 16, & 18.**