Warm-Up

Grade your partner's HW. Grade problem #

x		f(x)	(x, f(x))

Essential Skill 3: Quadratic Functions

LT 3.2 Graphing Quadratic Functions Using the Equation of the Axis of Symmetry

# Learning Objective

I will be able to . . .

* Graph quadratic functions using the equation of the axis of symmetry.

* Find the y-intercept, the axis of symmetry, and the vertex of a quadratic function.

Axis of Symmetry is a line through the graph of a parabola that divides the graph into two congruent halves. Each side of the parabola is a reflection of the other side.

The axis of symmetry will intersect a parabola at only one point, called the vertex.
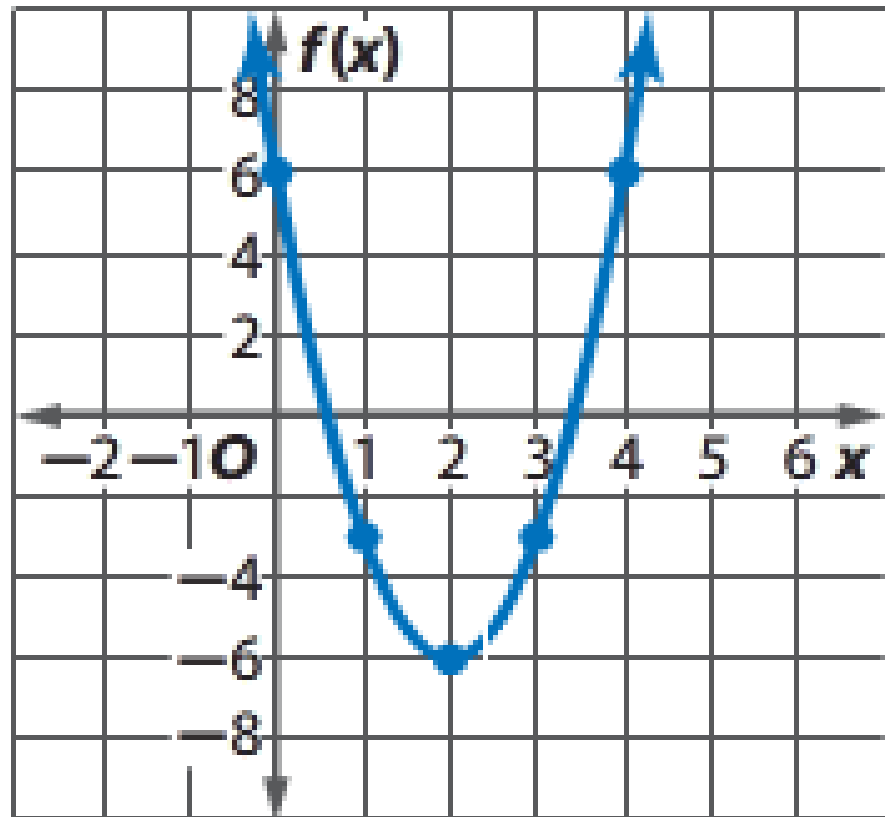
KeyConcept Graph of a Quadratic Function—Parabola

Words

Consider the graph of $y = ax^2 + bx + c$, where $a \neq 0$.

- The y-intercept is $a(0)^2 + b(0) + c$ or c.
- The equation of the axis of symmetry is $x = -\dfrac{b}{2a}$.
- The x-coordinate of the vertex is $-\dfrac{b}{2a}$.
- The y-coordinate of the vertex is

Model

Equation of the | axis of symmetry: $x = -\dfrac{b}{2a}$

y-intercept: c

reflection of y-intercept
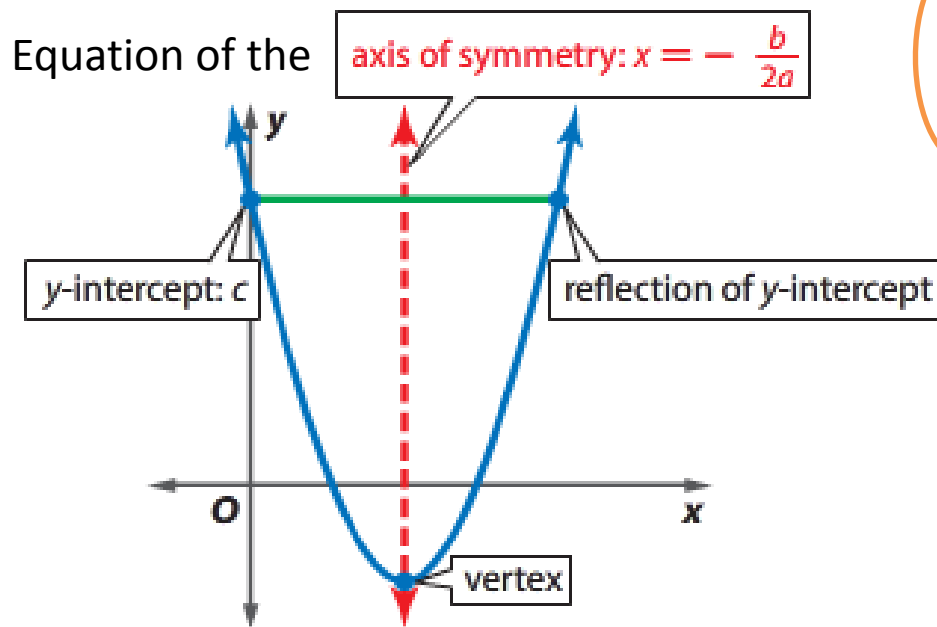
vertex

Y-intercept: Where the graph crosses the y-axis.

(0, y)

- Graph the quadratic function.

Ex1 $f(x) = x^2 + 4x - 3.$

1. Find the terms of the quadratic function.

2. Find the y-intercept

3. Find the vertex.

   a. Find the x-coordinate of the vertex

   b. Find the y-coordinate of the vertex

4. Graph the quadratic function.

$$f(x) = ax^2 + bx + c$$
$$\downarrow \quad \downarrow \quad \downarrow$$
$$f(x) = 1x^2 + 4x - 3$$

Ex1 $f(x) = x^2 + 4x - 3.$

$$f(x) = ax^2 + bx + c$$

$$\downarrow \qquad \downarrow \qquad \downarrow$$

$$f(x) = 1x^2 + 4x - 3$$

1. a= 1   b= 4   c= -3

2. y-intercept: (0,y)

  f(0) = 1(0)^2 + 4(0) − 3

  f(0) = 1(0) + 0 − 3

  f(0) = 0 + 0 − 3 = -3

3. The equation of the axis of symmetry $x = -\dfrac{b}{2a}$
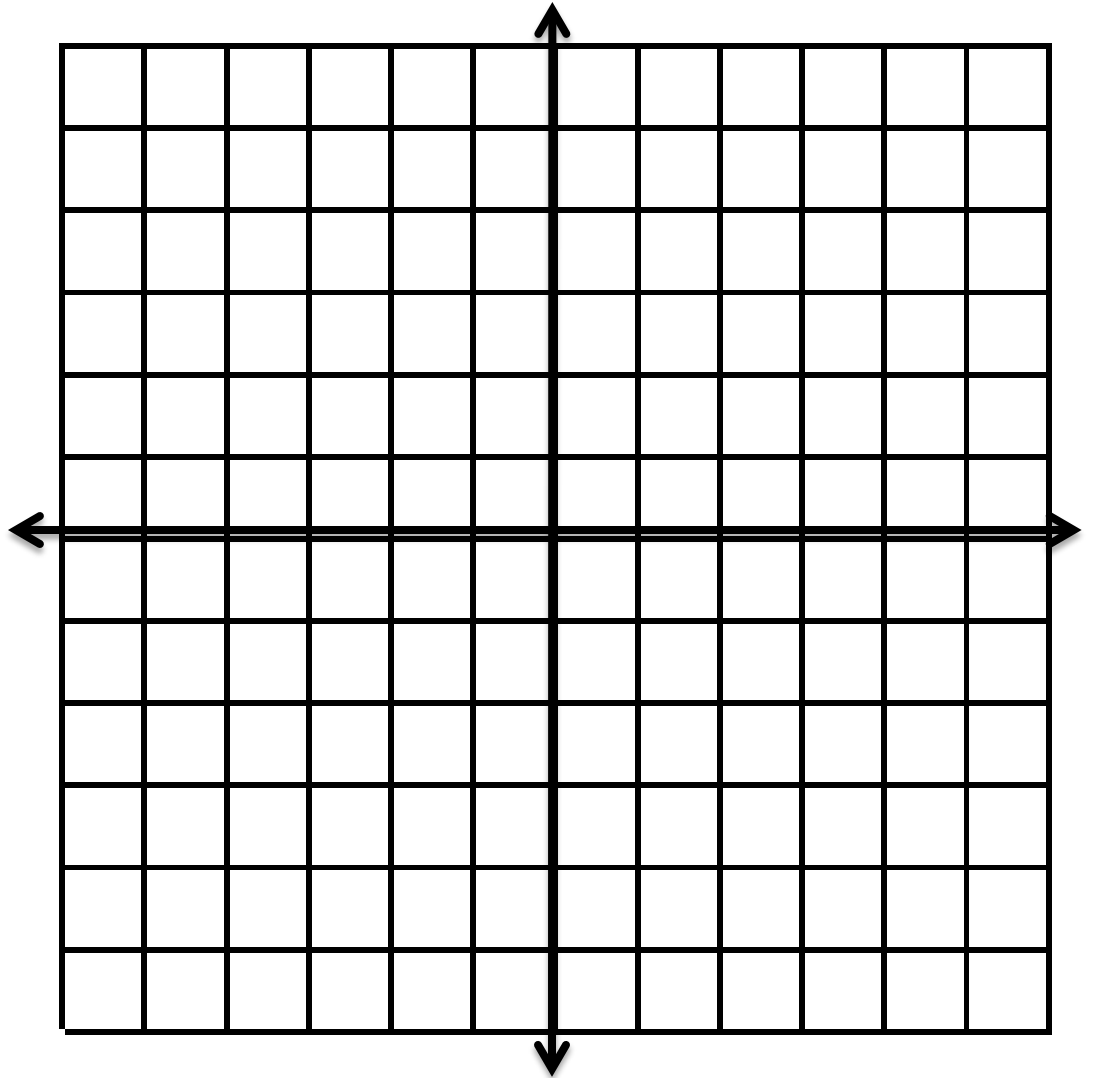
a= 1   b= 4   c= -3

a.   Vertex = x =

b.   Find the y-coordinate of the vertex

$$f(x) = x^2 + 4x - 3.$$

f( ) =

f( ) =

4. Graph the quadratic function.

Ex2: $f(x) = -5x^2 - 10x + 6.$

1. Find the y-intercept
2. Find the equation of the axis of symmetry.
3. Find the x-coordinate of the vertex
4. Find the y-coordinate of the vertex
5. Graph the quadratic function.

$$f(x) = ax^2 + bx + c$$
$$\downarrow \quad \downarrow \quad \downarrow$$
$$f(x) = -5x^2 - 10x + 6.$$

a=   b=   c=   use this ex later

Ex3

Now let us use the axis of symmetry to help us plot points and graph a parabola.

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