

# LESSON 1-Key Features of Basic Quadratic Functions

## KEY TERMS

- \_\_\_\_\_ can be described by the equation  $y = -ax^2 + bx + c$  where  $a \neq 0$ . In a quadratic function, the greatest power of the variable is 2. The graph of a quadratic function is called a \_\_\_\_\_
- The \_\_\_\_\_ of a graph is the point at which a line intercepts the  $x$ - or  $y$ -axis.
- The \_\_\_\_\_ is the point at which a graph crosses the  $x$ -axis. It is written as  $(x, 0)$ .
- The  $x$ -intercepts of a quadratic function occur when the parabola intersects the  $x$ -axis at  $(x, 0)$ .
- The \_\_\_\_\_ of a quadratic function is the point at which the graph intersects the  $y$ -axis. It is written as  $(0, y)$ .
- **The  $y$ -intercept of a quadratic is the  $c$  value of the quadratic equation when written in standard form.**  
( $y = -ax^2 + bx + c$ )

## Example 1:

Graph the quadratic function,

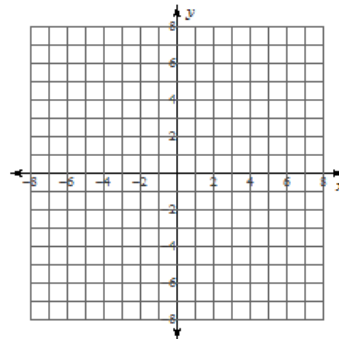
$$f(x) = x^2 - 2x - 3.$$

$$a = \underline{\quad} \quad b = \underline{\quad} \quad c = \underline{\quad}$$

Determine the  $x$  and  $y$ - intercepts.

$x$ -intercept: \_\_\_\_\_

$y$ -intercept: \_\_\_\_\_



## KEY TERMS

- The \_\_\_\_\_ is the line through the parabola about which the parabola is symmetric.
- The equation of the axis of symmetry is \_\_\_\_\_

## Example 2:

Identify the key features of the following function

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

$$a = \underline{\quad} \quad b = \underline{\quad} \quad c = \underline{\quad}$$

$$x = \frac{-b}{2a} = \underline{\hspace{2cm}}$$

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

Vertex: use standard for

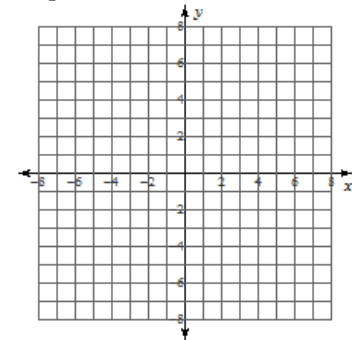
$$y = -ax^2 + bx + c$$

$$y = \underline{\hspace{2cm}}$$

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

$x$ -intercept: \_\_\_\_\_

$y$ -intercept: \_\_\_\_\_



## Example 3:

Identify the key features of the following function

$$f(x) = -2x^2 + 16x - 30,$$

$$a = \underline{\quad} \quad b = \underline{\quad} \quad c = \underline{\quad}$$

$$x = \frac{-b}{2a} = \underline{\hspace{2cm}}$$

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

Vertex: use standard for

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

$$y = \underline{\hspace{2cm}}$$

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

$x$ -intercept: \_\_\_\_\_

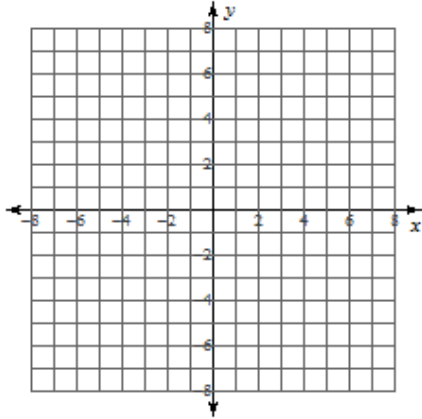
$y$ -intercept: \_\_\_\_\_



# Lesson 1: Practice

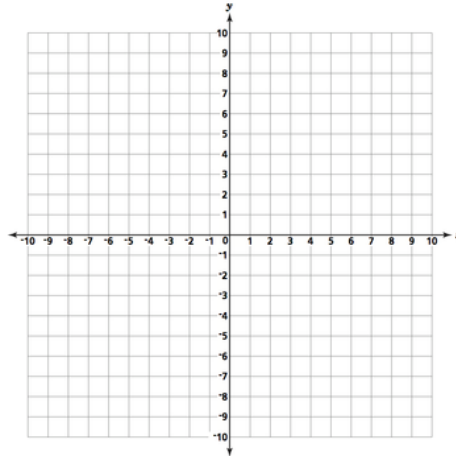
Identify the key features of the function then graph #1, #3, and #5.

1.  $y = -x^2 + 4$   
 Axis of Symmetry: \_\_\_\_\_  
 Vertex: \_\_\_\_\_  
 Direction of the opening: \_\_\_\_\_  
 x-intercept: \_\_\_\_\_  
 y-intercept: \_\_\_\_\_



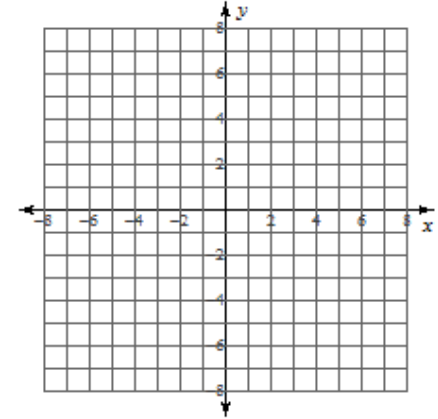
2.  $y = x^2 + 6x - 16$   
 $a = \underline{\quad}$   $b = \underline{\quad}$   $c = \underline{\quad}$   
 $x = \frac{-b}{2a} = \underline{\hspace{2cm}}$   
 Axis of Symmetry: \_\_\_\_\_  
  
 Vertex: use standard for  
 $y = -ax^2 + bx + c$   
 $y = \underline{\hspace{2cm}}$   
 Vertex: \_\_\_\_\_  
 Direction of the opening: \_\_\_\_\_  
 x-intercept: \_\_\_\_\_  
 y-intercept: \_\_\_\_\_

3.  $y = x^2 + 4x - 5$   
 Axis of Symmetry: \_\_\_\_\_  
 Vertex: \_\_\_\_\_  
 Direction of the opening: \_\_\_\_\_  
 x-intercept: \_\_\_\_\_  
 y-intercept: \_\_\_\_\_



4.  $y = x^2 - 10x + 16$   
 $a = \underline{\quad}$   $b = \underline{\quad}$   $c = \underline{\quad}$   
 $x = \frac{-b}{2a} = \underline{\hspace{2cm}}$   
 Axis of Symmetry: \_\_\_\_\_  
  
 Vertex: use standard for  
 $y = -ax^2 + bx + c$   
 $y = \underline{\hspace{2cm}}$   
 Vertex: \_\_\_\_\_  
 Direction of the opening: \_\_\_\_\_  
 x-intercept: \_\_\_\_\_  
 y-intercept: \_\_\_\_\_

5.  $y = -x^2 - 4x - 7$   
 Axis of Symmetry: \_\_\_\_\_  
 Vertex: \_\_\_\_\_  
 Direction of the opening: \_\_\_\_\_  
 x-intercept: \_\_\_\_\_  
 y-intercept: \_\_\_\_\_



6.  $y = x^2 - 4x - 12$   
 $a = \underline{\quad}$   $b = \underline{\quad}$   $c = \underline{\quad}$   
 $x = \frac{-b}{2a} = \underline{\hspace{2cm}}$   
 Axis of Symmetry: \_\_\_\_\_  
  
 Vertex: use standard for  
 $y = -ax^2 + bx + c$   
 $y = \underline{\hspace{2cm}}$   
 Vertex: \_\_\_\_\_  
 Direction of the opening: \_\_\_\_\_  
 x-intercept: \_\_\_\_\_  
 y-intercept: \_\_\_\_\_