

# Chapter 2 Polynomial and Rational Functions

Course Number

Instructor

Date

## Section 2.1 Quadratic Functions

**Objective:** In this lesson you learned how to sketch and analyze graphs of quadratic functions.

### Important Vocabulary

Define each term or concept.

**Constant function**

**Linear function**

**Quadratic function**

**Axis of symmetry**

**Vertex**

### I. The Graph of a Quadratic Function (Pages 136–138)

Let  $n$  be a nonnegative integer and let  $a_n, a_{n-1}, \dots, a_2, a_1, a_0$  be real numbers with  $a_n \neq 0$ . A **polynomial function of  $x$  with degree  $n$**  is . . .

#### *What you should learn*

How to analyze graphs of quadratic functions

A quadratic function is a polynomial function of \_\_\_\_\_ degree. The graph of a quadratic function is a special “U”-shaped curve called a \_\_\_\_\_.

If the leading coefficient of a quadratic function is positive, the graph of the function opens \_\_\_\_\_ and the vertex of the parabola is the \_\_\_\_\_ point on the graph. If the leading coefficient of a quadratic function is negative, the graph of the function opens \_\_\_\_\_ and the vertex of the parabola is the \_\_\_\_\_ point on the graph.

**II. The Standard Form of a Quadratic Function**

(Pages 139–140)

The **standard form of a quadratic function** is

\_\_\_\_\_.

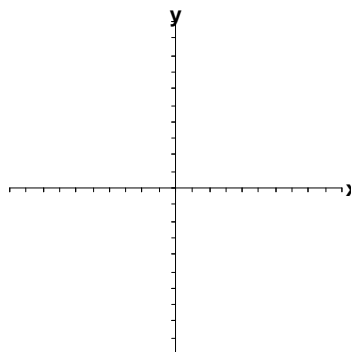
For a quadratic function in standard form, the axis of the associated parabola is \_\_\_\_\_ and the vertex is

\_\_\_\_\_.

To write a quadratic function in standard form, . . .

To find the  $x$ -intercepts of the graph of  $f(x) = ax^2 + bx + c$ , . . .

**Example 1:** Sketch the graph of  $f(x) = x^2 + 2x - 8$  and identify the vertex, axis, and  $x$ -intercepts of the parabola.

**III. Applications** (Pages 141–142)For a quadratic function in the form  $f(x) = ax^2 + bx + c$ , when  $a > 0$ ,  $f$  has a minimum that occurs at \_\_\_\_\_.When  $a < 0$ ,  $f$  has a maximum that occurs at \_\_\_\_\_.

To find the minimum or maximum value, \_\_\_\_\_

\_\_\_\_\_.

**Example 2:** Find the minimum value of the function  $f(x) = 3x^2 - 11x + 16$ . At what value of  $x$  does this minimum occur?

**What you should learn**

How to use quadratic functions to model and solve real-life problems

**Homework Assignment**

Page(s)

Exercises