

Chapter 3 Polynomial and Rational Functions

Course Number

Instructor

Date

Section 3.1 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 226–228)

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 229–230)

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

_____.

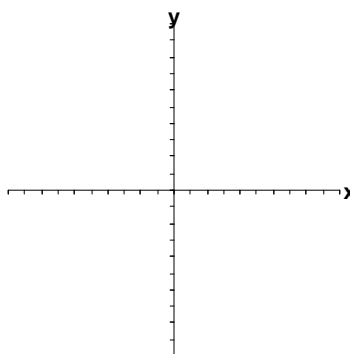
For a quadratic function in standard form, the axis of the associated parabola is _____ and the vertex is

_____.

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 231–232)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