

Section 9.3 Hyperbolas

Objective: In this lesson you learned how to write the standard form of the equation of a hyperbola, and analyze and sketch the graphs of hyperbolas.

Course Number

Instructor

Date

Important Vocabulary

Define each term or concept.

Branches**Transverse axis****Conjugate axis****I. Introduction** (Pages 680–681)A **hyperbola** is . . .

What you should learn
How to write equations of hyperbolas in standard form

The line through a hyperbola's two foci intersects the hyperbola at two points called _____.

The midpoint of a hyperbola's transverse axis is the _____ of the hyperbola.

The standard form of the equation of a hyperbola centered at (h, k) and having a horizontal transverse axis is

The standard form of the equation of a hyperbola centered at (h, k) and having a vertical transverse axis is

In each case, the vertices and foci are, respectively, a and c units from the center. Moreover, a , b , and c are related by the equation

_____.

If the center of the hyperbola is at the origin $(0, 0)$, the equation takes one of the following forms: _____ or

_____.

II. Asymptotes of a Hyperbola (Pages 682–684)

The **asymptotes** of a hyperbola with a horizontal transverse axis are _____.

The **asymptotes** of a hyperbola with a vertical transverse axis are _____.

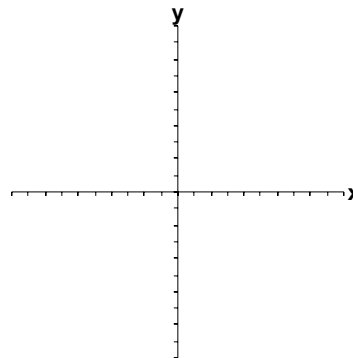
Example 1: Sketch the graph of the hyperbola given by

$$y^2 - 9x^2 = 9.$$

The **eccentricity** of a hyperbola is $e =$ _____, where the values of e are _____.

What you should learn

How to find asymptotes of and graph hyperbolas

**III. Applications of Hyperbolas** (Page 685)

Describe a real-life application in which hyperbolas occur or are used.

What you should learn

How to use properties of hyperbolas to solve real-life problems

IV. General Equations of Conics (Page 686)

The graph of $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$ is one of the following:

- 1) Circle if _____
- 2) Parabola if _____
- 3) Ellipse if _____
- 4) Hyperbola if _____

What you should learn

How to classify conics from their general equations

Example 2: Classify the equation $9x^2 + y^2 - 18x - 4y + 4 = 0$ as a circle, a parabola, an ellipse, or a hyperbola.

Homework Assignment

Page(s)

Exercises