Chapter 11 Topics in Analytic Geometry

Course Number
Instructor
Date

Section 11.1 Conics

Objective: In this lesson you learned how to recognize the four basic conics: circles, ellipses, parabolas, and hyperbolas and how to recognize, graph, and write equations of conics with vertex or center at the origin.

Important Vocabulary Define each term or concept.

Directrix

Focus of a parabola

Foci

Vertices

Major axis

Center

Minor axis

Transverse axis

Conjugate axis

I. Introduction (Page 774)

What you should learn
How to recognize the four basic conics

A **conic section,** or **conic,** is . . .

Name the four basic conic sections:

In the formation of the four basic conics, the intersecting plane does not pass through the vertex of the cone. When the plane does pass through the vertex, the resulting figure is a ________________________, such as . . .

II. Parabolas (Pages 775–776)

> ***What you should learn***
> How to recognize, graph, and write equations of parabolas (vertex at the origin)

A **parabola** is . . .

The _______________ of a parabola is the midpoint between the focus and the directrix. The _____________ of the parabola is the line passing through the focus and the vertex.

The standard form of the equation of a parabola with vertex at (0, 0) and directrix $y = -p$ is _________________________.
For directrix $x = -p$, the equation is _______________________.

Example 1: Find an equation of the parabola with vertex at the origin if the parabola has the directrix $x = -1$.

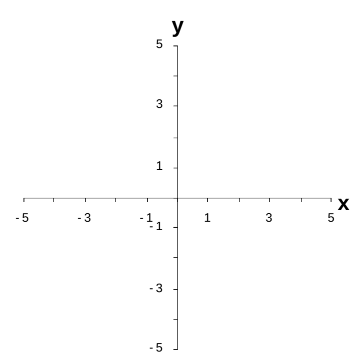
III. Ellipses (Pages 777–778)

> ***What you should learn***
> How to recognize, graph, and write equations of ellipses (center at the origin)

An **ellipse** is . . .

The **standard form of the equation of an ellipse** centered at the origin with major and minor axes of lengths $2a$ and $2b$ (where $0 < b < a$) is ____________________________ or ____________________________. The vertices and foci lie on the major axis, a and c units, respectively, from the center. Moreover, a, b, and c are related by the equation _______________________.

Example 2: Sketch the ellipse given by $4x^2 + 25y^2 = 100$.



IV. Hyperbolas (Pages 779–782)

> ***What you should learn***
> How to recognize, graph, and write equations of hyperbolas (center at the origin)

A **hyperbola** is . . .

The foci of a hyperbola are . . .

The branches of a hyperbola are . . .

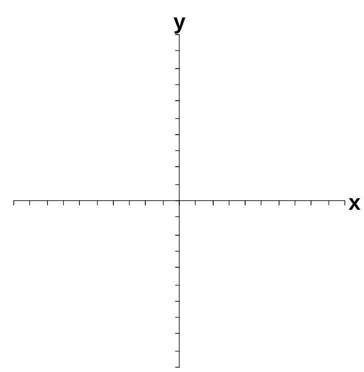
The line through a hyperbola's two foci intersects the hyperbola at two points called __________________.

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

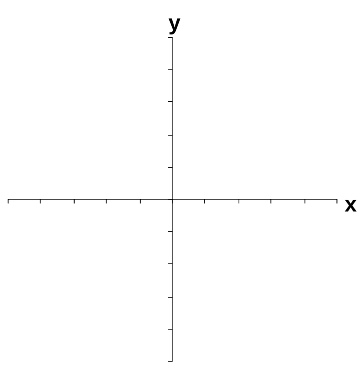
The **standard form of the equation of a hyperbola** with center at the origin (where $a \neq 0$ and $b \neq 0$) is _____________________ or ________________________. The vertices and foci are, respectively, a and c units from the center. Moreover, a, b, and c are related by the equation _____________________.

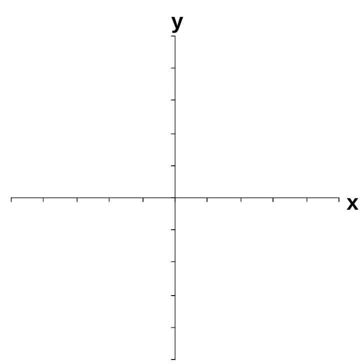
The **asymptotes of a hyperbola** with horizontal transverse axis and center at (0, 0) are ______________ and _________________. The **asymptotes of a hyperbola** with vertical transverse axis and center at (0, 0) are______________ and _________________.

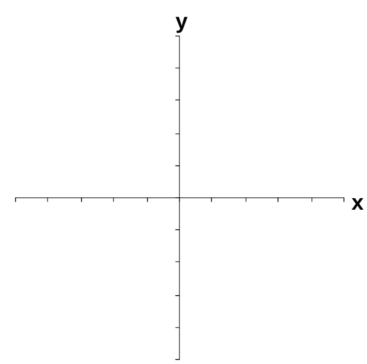
Example 3: Sketch the graph of the hyperbola given by $y^2 - 9x^2 = 9$.

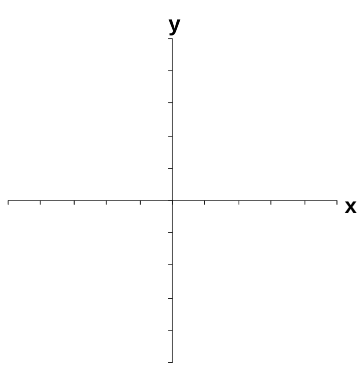


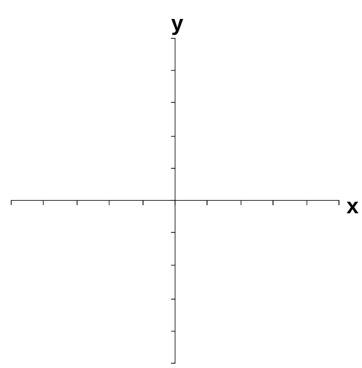
Additional notes

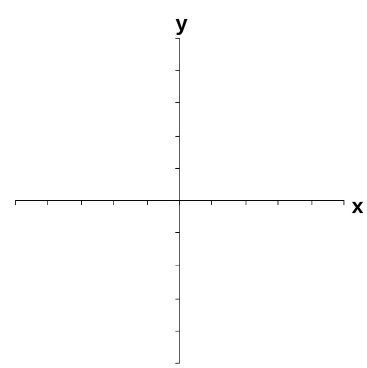












Homework Assignment

Page(s)

Exercises