

Section 10.5 Rotation of Conics

Objective: In this lesson you learned how to eliminate the xy -term in the equation of a conic and use the discriminant to identify a conic.

Course Number

Instructor

Date

Important Vocabulary

Define each term or concept.

Invariant under rotation**Discriminant****I. Rotation** (Pages 804–807)

The general equation of a conic whose axes are rotated so that they are not parallel to either the x -axis or the y -axis contains a(n) _____.

To eliminate this term, you can use a procedure called _____, whose goal is to rotate the x - and y -axes until they are parallel to the axes of the conic.

The general second-degree equation

$Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$ can be rewritten as

$A'(x')^2 + C'(y')^2 + D'x' + E'y' + F' = 0$ by rotating the

coordinate axes through an angle q , where

$\cot 2q =$ _____.

The coefficients of the new equation are obtained by making the substitutions $x =$ _____ and

$y =$ _____.

What you should learn

How to rotate the coordinate axes to eliminate the xy -term in the equation of a conic

II. Invariants Under Rotation (Pages 808–809)

The rotation of the coordinate axes through an angle q that transforms the equation $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$ into the form $A'(x')^2 + C'(y')^2 + D'x' + E'y' + F' = 0$ has the following rotation invariants:

1)

2)

3)

The graph of the equation $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$ is, except in degenerate cases, determined by its discriminant as follows:

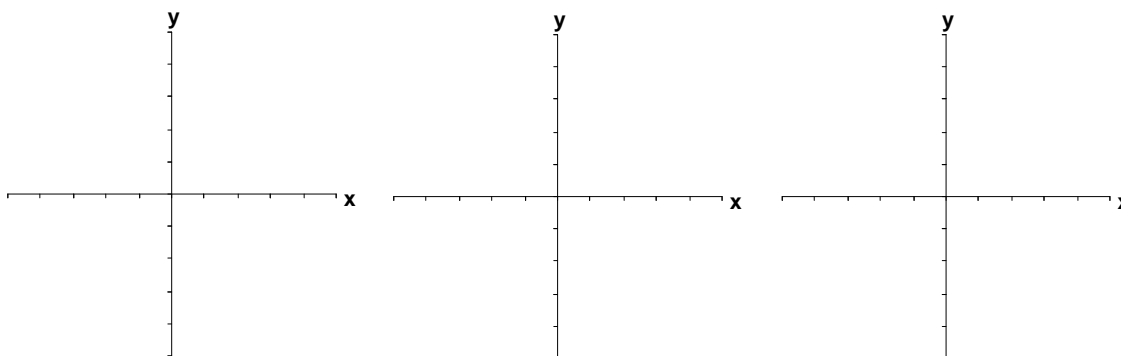
1) Ellipse or circle if: _____

2) Parabola if: _____

3) Hyperbola if: _____

Example 1: Classify the graph of the following conic:

$$2x^2 + 12xy + 18y^2 - 3y - 5 = 0$$



Homework Assignment

Page(s)

Exercises

What you should learn

How to use the discriminant to classify a conic