

7-3 Study Guide and Intervention (continued)

Hyperbolas

Identify Conic Sections You can determine the type of conic when the equation for the conic is in general form, $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$. The discriminant, or $B^2 - 4AC$, can be used to identify a conic when the equation is in general form.

Discriminant	Conic Section
less than 0; $B = 0$ and $A = C$	circle
less than 0; $B \neq 0$ or $A \neq C$	ellipse
equal to 0	parabola
greater than 0	hyperbola

Exercises

Use the discriminant to identify each conic section.

1. $4x^2 + 4y^2 - 2x - 9y + 1 = 0$

2. $10x^2 + 6y^2 - x + 8y + 1 = 0$

3. $-2x^2 + 6xy + y^2 - 4x - 5y + 2 = 0$

4. $x^2 + 6xy + y^2 - 2x + 1 = 0$

5. $5x^2 + 2xy + 4y^2 + x + 2y + 17 = 0$

6. $x^2 + 2xy + y^2 + x + 10 = 0$

7. $25x^2 + 100x - 54y = -200$

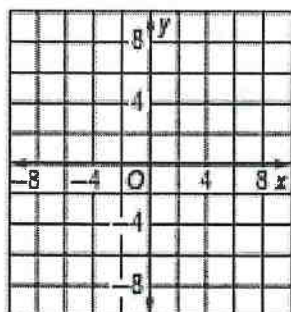
8. $16x^2 + 100x - 54y^2 = -100$

Lesson 7-3

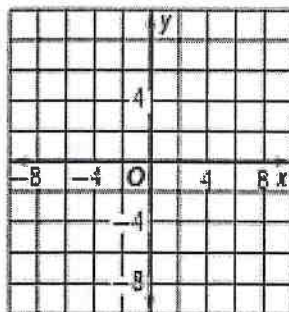
Exercises

Graph the hyperbola given by each equation.

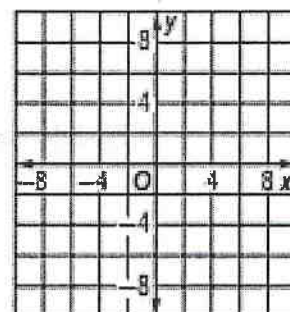
1. $\frac{x^2}{25} - \frac{y^2}{36} = 1$



2. $\frac{(y - 3)^2}{25} - \frac{(x + 2)^2}{9} = 1$



3. $\frac{(x - 1)^2}{16} - \frac{(y + 2)^2}{36} = 1$

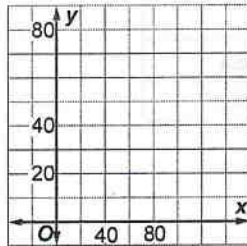


7-3 Word Problem Practice

Hyperbolas

1. **EARTHQUAKES** The epicenter of an earthquake lies on a branch of the hyperbola represented by $\frac{(x-50)^2}{1600} - \frac{(y-35)^2}{2500} = 1$, where the seismographs are located at the foci.

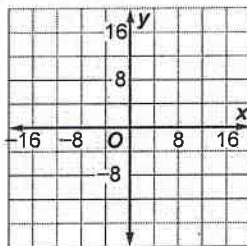
a. Graph the hyperbola.



b. Find the locations of the seismographs.

2. **SHADOWS** A lamp projects light onto a wall in the shape of a hyperbola. The edge of the light can be modeled by $\frac{y^2}{196} - \frac{x^2}{121} = 1$.

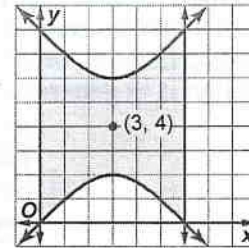
a. Graph the hyperbola.



b. Write the equations of the asymptotes.

c. Find the eccentricity.

3. **PARKS** A grassy play area is in the shape of a hyperbola, as shown.



a. Write an equation that models the curved sides of the play area.

b. If each unit on the coordinate plane represents 3 feet, what is the narrowest vertical width of the play area?

4. Use the discriminant to identify each conic section.

a. $-2x^2 + 6xy + y^2 - 4x - 5y + 2 = 0$

b. $x^2 + 6xy + y^2 - 2x + 1 = 0$

c. $5x^2 + 2xy + 4y^2 + x + 2y + 17 = 0$

d. $x^2 + 2xy + y^2 + x + 10 = 0$