

# 9

## CHAPTER REVIEW

### 9.6 Translate and Classify Conic Sections

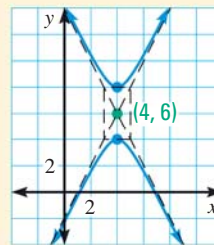
pp. 650–657

#### EXAMPLE

Classify the conic section  $-4x^2 + y^2 + 32x - 12y - 32 = 0$  and write its equation in standard form. Then graph the equation.

Because  $A = -4$ ,  $B = 0$ , and  $C = 1$ , the discriminant is  $B^2 - 4AC = 16 > 0$ , so the conic is a hyperbola. Complete the square to write the equation in standard form.

$$\begin{aligned} -4x^2 + y^2 + 32x - 12y - 32 &= 0 \\ (y^2 - 12y) - 4(x^2 - 8x) &= 32 \\ (y^2 - 12y + 36) - 4(x^2 - 8x + 16) &= 32 + 36 - 4(16) \\ (y - 6)^2 - 4(x - 4)^2 &= 4 \\ \frac{(y - 6)^2}{4} - (x - 4)^2 &= 1 \end{aligned}$$



From the equation,  $(h, k) = (4, 6)$ ,  $a = \sqrt{4} = 2$ , and  $b = 1$ . The vertices are  $(4, 6 + 2) = (4, 8)$  and  $(4, 6 - 2) = (4, 4)$ . The graph is shown above.

#### EXERCISES

Classify the conic section and write its equation in standard form. Then graph the equation.

31.  $4x^2 + 9y^2 + 40x + 72y + 208 = 0$

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

33.  $9x^2 - y^2 - 18x - 4y - 5 = 0$

34.  $x^2 + y^2 + 4x - 14y + 17 = 0$

#### EXAMPLE 6

on p. 653  
for Exs. 31–34

### 9.7 Solve Quadratic Systems

pp. 658–664

#### EXAMPLE

Solve the system.  $12x^2 - 81y^2 + 16 = 0$   
 $2x^2 + 9y = 0$

Write the second equation as  $y = -\frac{2}{9}x^2$ . Then substitute in the first equation.

$$12x^2 - 81\left(-\frac{2}{9}x^2\right)^2 + 16 = 0 \quad \text{Substitute for } y \text{ in first equation.}$$

$$12x^2 - 4x^4 + 16 = 0 \quad \text{Simplify.}$$

$$x^4 - 3x^2 - 4 = 0 \quad \text{Divide each side by } -4.$$

$$(x^2 - 4)(x^2 + 1) = 0 \quad \text{Factor.}$$

By the zero product property,  $x = \pm 2$ . The solutions are  $\left(2, -\frac{8}{9}\right)$  and  $\left(-2, -\frac{8}{9}\right)$ .

#### EXERCISES

Solve the system.

35.  $y^2 = 4x$

36.  $x^2 + y^2 - 100 = 0$

37.  $16x^2 - 4y^2 = 64$

$2x - 5y = -8$

$x + y - 14 = 0$

$4x^2 + 9y^2 - 40x = -64$

#### EXAMPLES 2 and 3

on pp. 659–660  
for Exs. 35–37