EXAMPLE 6
on p. 653
for Exs. 28–36

CLASSIFYING CONICS Use the discriminant to classify the conic section.

28. $6x^2 - 2y^2 + 24x + 2y - 1 = 0$

29. $x^2 + y^2 - 10x - 6y + 18 = 0$

30. $y^2 - 10y - 5x + 57 = 0$

31. $4x^2 + y^2 - 48x - 14y + 189 = 0$

32. $9x^2 + 4y^2 + 8y + 18x - 41 = 0$

33. $x^2 - 18x + 6y + 99 = 0$

34. $x^2 + y^2 - 6x + 8y - 24 = 0$

35. $8x^2 - 9y^2 - 40x + 4y + 145 = 0$

36. ◆ **TAKS REASONING** The equation $4x^2 + y^2 + 32x - 10y + 85 = 0$ represents what conic section?

   (A) Circle   **(B)** Ellipse   **(C)** Hyperbola   **(D)** Parabola

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

37. $x^2 + y^2 - 14x + 4y - 11 = 0$

38. $x^2 + 4y^2 - 10x + 16y + 37 = 0$

39. $x^2 - 16x - 8y + 80 = 0$

40. $9y^2 - x^2 - 54y + 8x + 56 = 0$

41. $9x^2 + 4y^2 - 36x - 24y + 36 = 0$

42. $y^2 + 14y + 16x + 33 = 0$

43. $x^2 + y^2 + 16x - 8y + 16 = 0$

44. $x^2 - 4y^2 + 8x - 24y - 24 = 0$

45. ◆ **TAKS REASONING** Consider a general second-degree equation where $B = 0$. *Explain* how you can classify the equation's graph without graphing or using the discriminant.

46. **REASONING** In Chapter 8, you graphed hyperbolas with equations of the form $y = \dfrac{a}{x}$. Write $y = \dfrac{a}{x}$ as a general second-degree equation, and use the discriminant to show that the graph is a hyperbola.

47. **CHALLENGE** Find expressions in terms of c, h, and k for the coordinates of the foci of a hyperbola with a vertical transverse axis and center (h, k). Then find equations of the asymptotes in terms of a, b, h, and k.

PROBLEM SOLVING

48. **ICE SKATING** A figure skater practices skating figure eights, which are formed by etching two externally tangent circles in the ice. Write equations for the circles in a figure eight if each is 8 feet in diameter, the circles intersect at the origin, and the centers of the circles are on the y-axis.

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(49.) **JUMPING STILTS** The leap of a person wearing "jumping stilts" is modeled by $x^2 - 10x + 4y = 0$ where x and y are in feet and the origin marks the start of the leap. Write an equation in standard form for the path of the leap. How high and how far does the person jump?

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50. **SPACECRAFT** A spacecraft uses Saturn's gravitational force to "slingshot" around the planet on the path $21y^2 - 210y - 4x^2 = -441$, where the origin represents Saturn's center and x and y are in hundreds of thousands of kilometers. What is the shape of the path? Write an equation in standard form for the path. Then graph the equation.

○ = **WORKED-OUT SOLUTIONS**
 on p. WS1

◆ = **TAKS PRACTICE AND REASONING**