35. **TAKS REASONING** What is an equation of the ellipse with center at the origin, a vertex at $(0, -12)$, and a co-vertex at $(-8, 0)$?

(A) $\frac{x^2}{144} + \frac{y^2}{64} = 1$ (B) $\frac{x^2}{64} + \frac{y^2}{144} = 1$ (C) $\frac{x^2}{12} + \frac{y^2}{8} = 1$ (D) $\frac{x^2}{8} + \frac{y^2}{12} = 1$

GRAPHING In Exercises 36–44, the equations of parabolas, circles, and ellipses are given. Graph the equation.

36. $x^2 + y^2 = 64$

37. $25x^2 + 81y^2 = 2025$

38. $36y + x^2 = 0$

39. $65y^2 = 130x$

40. $30x^2 + 30y^2 = 480$

41. $\frac{x^2}{75} + \frac{4y}{25} = 0$

42. $\frac{3x^2}{48} + \frac{4y^2}{400} = 1$

43. $\frac{x^2}{64} + \frac{y^2}{64} = 4$

44. $16x^2 + 10y^2 = 160$

45. **TAKS REASONING** Consider the graph of $\frac{x^2}{9} + \frac{y^2}{25} = 1$. *Describe* the effects on the graph of changing the denominator of the y^2-term first from 25 to 9 and then from 9 to 4. Graph the original equation and the two revised equations in the same coordinate plane.

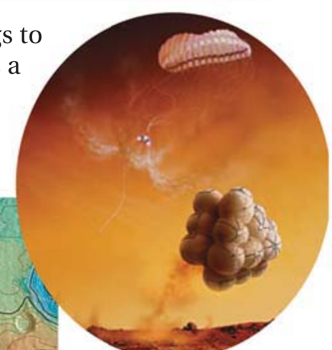
46. **TAKS REASONING** Write an equation of an ellipse in standard form. Graph the equation on a graphing calculator by rewriting it as two functions. Give a viewing window that does not distort the shape of the ellipse, and explain how you found your viewing window.

47. **CHALLENGE** Use the definition of an ellipse to show that $c^2 = a^2 - b^2$ for any ellipse with equation $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and foci at $(c, 0)$ and $(-c, 0)$. (*Hint:* Draw a diagram. Consider the point $P(a, 0)$ on the ellipse.)

PROBLEM SOLVING

EXAMPLE 3 on p. 636 for Exs. 48–50

48. **MARS** On January 3, 2004, the Mars rover Spirit bounced on its airbags to a landing within Gusev crater. Scientists had estimated that there was a 99% chance the rover would land inside an ellipse with a major axis 81 kilometers long and a minor axis 12 kilometers long. Write an equation of the ellipse. Then find its area.



Artist's rendering of landing

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49. **AUSTRALIAN FOOTBALL** The playing field for Australian football is an ellipse that is between 135 and 185 meters long and between 110 and 155 meters wide. Write equations of ellipses with vertical major axes that model the largest and smallest fields described. Then write an inequality that describes the possible areas of these fields.

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