

26. **TAKS REASONING** What is an equation of the hyperbola with foci at  $(0, -6\sqrt{3})$  and  $(0, 6\sqrt{3})$  and with vertices at  $(0, -8)$  and  $(0, 8)$ ?

Ⓐ  $\frac{x^2}{64} - \frac{y^2}{108} = 1$    Ⓑ  $\frac{x^2}{44} - \frac{y^2}{68} = 1$    Ⓒ  $\frac{y^2}{64} - \frac{x^2}{44} = 1$    Ⓓ  $\frac{y^2}{108} - \frac{x^2}{64} = 1$

**GRAPHING** In Exercises 27–32, the equations of parabolas, circles, ellipses, and hyperbolas are given. Graph the equation.

27.  $\frac{x^2}{25} - \frac{y^2}{49} = 1$       28.  $y^2 = 18x$       29.  $48x^2 + 12y^2 = 48$   
 30.  $\frac{x^2}{144} + \frac{y^2}{256} = 1$       31.  $\frac{y^2}{25} - \frac{x^2}{121} = 1$       32.  $18x^2 + 18y^2 = 288$

33. **TAKS REASONING** Describe the effects of the indicated change on the shape of the hyperbola and on the locations of the vertices and foci.

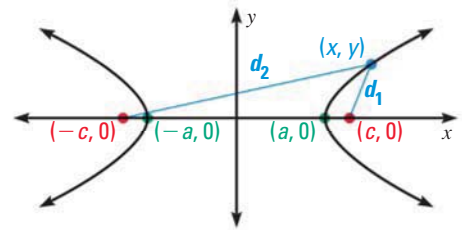
a.  $\frac{x^2}{9} - \frac{y^2}{36} = 1$ ; change 36 to 4      b.  $\frac{y^2}{16} - \frac{x^2}{4} = 1$ ; change 4 to 25

34. **GRAPHING CALCULATOR** Graph each hyperbola using a graphing calculator. Tell what two functions you entered into the calculator.

a.  $\frac{y^2}{15} - \frac{x^2}{30} = 1$       b.  $\frac{x^2}{8.4} - \frac{y^2}{5.5} = 1$       c.  $5x^2 - 7.5y^2 = 12$

35. **TAKS REASONING** Give equations of three hyperbolas with horizontal transverse axes and asymptotes  $y = \pm 2x$ . Compare the hyperbolas.

36. **REASONING** Use the diagram at the right to show that  $|d_2 - d_1| = 2a$ . (Hint:  $|d_2 - d_1|$  is constant, so choose a convenient location for  $(x, y)$ .)



37. **CHALLENGE** Using the distance formula and the definition of a hyperbola, write an equation in standard form of the hyperbola with foci at  $(\pm 2, 0)$  if the difference in the distances from a point  $(x, y)$  on the hyperbola to the foci is 2.

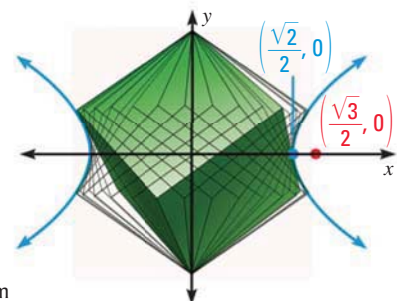
## PROBLEM SOLVING

**EXAMPLE 3** on p. 644 for Exs. 38–40

38. **TELESCOPES** A satellite is carrying a telescope that has a hyperbolic mirror for which  $a = 33$  and  $c = 56$  (in centimeters). Write an equation for the cross section of the mirror if the transverse axis is horizontal.

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39. **SPINNING CUBE** The outline of a cube spinning around an axis through a pair of opposite corners contains a portion of a hyperbola, as shown. The coordinates given represent a vertex and a focus of the hyperbola for a cube that measures 1 unit on each edge. Write an equation that models this hyperbola.



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