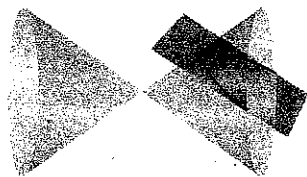
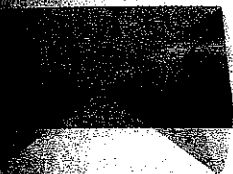


# Review Exercises

In Exercises 1 and 2, state what type of conic is formed by the intersection of the plane and the cone-napped cone.

2.



In Exercises 3–6, find the standard form of the equation of the parabola.

1. Vertex: (4, 2)

4. Vertex: (2, 0)

2. Focus: (4, 0)

5. Focus: (0, 0)

3. Vertex: (0, 2)

6. Vertex: (2, 2)

Directrix:  $x = -3$

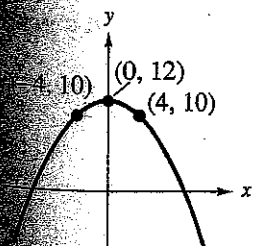
Directrix:  $y = 0$

In Exercises 7 and 8, find an equation of a tangent line to the parabola at the given point and find the  $x$ -intercept of the line.

7. Point:  $(2, -2)$

8. Point:  $(-4, -8)$

**Parabolic Archway** A parabolic archway is 12 meters high at the vertex. At a height of 10 meters, the width of the archway is 8 meters. How wide is the archway at ground level?



**Flashlight** The light bulb in a flashlight is at the focus of its parabolic reflector, 1.5 centimeters from the vertex of the reflector. Write an equation for a cross section of the flashlight's reflector with its focus on the positive  $x$ -axis and its vertex at the origin.

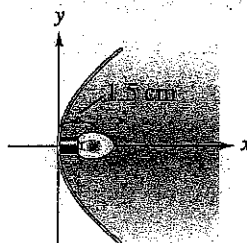


FIGURE FOR 10

**10.2** In Exercises 11–14, find the standard form of the equation of the ellipse.

11. Vertices:  $(-3, 0), (7, 0)$ ; Foci:  $(0, 0), (4, 0)$

12. Vertices:  $(2, 0), (2, 4)$ ; Foci:  $(2, 1), (2, 3)$

13. Vertices:  $(0, 1), (4, 1)$ ;

Endpoints of the minor axis:  $(2, 0), (2, 2)$

14. Vertices:  $(-4, -1), (-4, 11)$ ;

Endpoints of the minor axis:  $(-6, 5), (-2, 5)$

15. **Semielliptical Archway** A semielliptical archway is set on pillars that are 10 feet apart. Its height (atop the pillars) is 4 feet. Where should the foci be placed in order to sketch the semielliptical arch?

16. **Wading Pool** You are building a wading pool that is in the shape of an ellipse. Your plans give an equation for the elliptical shape of the pool measured in feet as

$$\frac{x^2}{324} + \frac{y^2}{196} = 1.$$

Find the longest distance across the pool, the shortest distance, and the distance between the foci.

In Exercises 17–20, find the center, vertices, foci, and eccentricity of the ellipse.

17.  $16x^2 + 9y^2 - 32x + 72y + 16 = 0$

18.  $4x^2 + 25y^2 + 16x - 150y + 141 = 0$

19.  $\frac{(x + 2)^2}{81} + \frac{(y - 1)^2}{100} = 1$

20.  $\frac{(x - 5)^2}{1} + \frac{(y + 3)^2}{36} = 1$

**10.3** In Exercises 21–24, find the standard form of the equation of the hyperbola.

21. Vertices:  $(-10, 3)$ ,  $(6, 3)$ ; Foci:  $(-12, 3)$ ,  $(8, 3)$   
 22. Vertices:  $(2, 2)$ ,  $(-2, 2)$ ; Foci:  $(4, 2)$ ,  $(-4, 2)$   
 23. Foci:  $(0, 0)$ ,  $(8, 0)$ ; Asymptotes:  $y = \pm 2(x - 4)$   
 24. Foci:  $(3, \pm 2)$ ; Asymptotes:  $y = \pm 2(x - 3)$

In Exercises 25–28, find the center, vertices, foci, and the equations of the asymptotes of the hyperbola. Then sketch its graph.

25.  $9x^2 - 16y^2 - 18x - 32y - 151 = 0$

26.  $-4x^2 + 25y^2 - 8x + 150y + 121 = 0$

27.  $\frac{(x - 3)^2}{16} - \frac{(y + 5)^2}{4} = 1$

28.  $\frac{(y - 1)^2}{4} - x^2 = 1$

29. **Loran** A radio transmitting station A is located 200 miles east of transmitting station B. A ship is in an area to the north and 40 miles west of the station A. Synchronized radio pulses transmitted at 186,000 miles per second by the two stations are received 0.0005 seconds sooner from station A than from station B. How far north is the ship?
30. **Locating an Explosion** Two of your friends live 4 miles apart and on the same “east-west” street, and you live halfway between them. You are having a three-way phone conversation when you hear an explosion. Six seconds later your friend to the east hears the explosion, and your friend to the west hears it 8 seconds after you do. Find equations of two hyperbolas that would locate the explosion. (Sound travels at a rate of 1100 feet per second.)

In Exercises 31 and 32, classify the conic from its general equation.

31.  $3x^2 + 2y^2 - 12x + 12y + 29 = 0$

32.  $4x^2 - 4y^2 - 4x + 8y - 11 = 0$