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

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

10.2 *In Exercises 11–16, graph each ellipse.*

11. $\dfrac{x^2}{36} + \dfrac{y^2}{25} = 1$
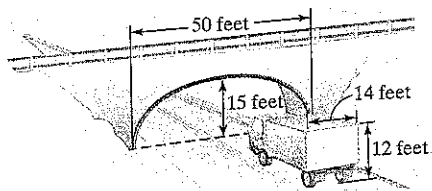
12. $\dfrac{x^2}{25} + \dfrac{y^2}{16} = 1$

13. $4x^2 + y^2 = 16$

14. $4x^2 + 9y^2 = 36$

15. $\dfrac{(x-1)^2}{16} + \dfrac{(y+2)^2}{9} = 1$

16. $\dfrac{(x+1)^2}{9} + \dfrac{(y-2)^2}{16} = 1$

17. A semielliptic archway has a height of 15 feet at the center and a width of 50 feet, as shown in the figure. The 50-foot width consists of a two-lane road. Can a truck that is 12 feet high and 14 feet wide drive under the archway without going into the other lane?

10.3 *In Exercises 18–21, use vertices and asymptotes to graph each hyperbola.*

18. $\dfrac{x^2}{16} - y^2 = 1$

19. $\dfrac{y^2}{16} - x^2 = 1$

20. $9x^2 - 16y^2 = 144$

21. $4y^2 - x^2 = 16$

10.4 *In Exercises 22–25, use the vertex and intercepts to sketch the graph of each equation. If needed, find additional points on the parabola by choosing values of y on each side of the axis of symmetry.*

22. $x = (y-3)^2 - 4$

23. $x = -2(y+3)^2 + 2$

24. $x = y^2 - 8y + 12$

25. $x = -y^2 - 4y + 6$

In Exercises 26–32, indicate whether the graph of each equation is a circle, an ellipse, a hyperbola, or a parabola.

26. $x + 8y = y^2 + 10$

27. $16x^2 = 32 - y^2$

28. $x^2 = 25 + 25y^2$

29. $x^2 = 4 - y^2$

30. $36y^2 = 576 + 16x^2$

31. $\dfrac{(x+3)^2}{9} + \dfrac{(y-4)^2}{25} = 1$

32. $y = x^2 + 6x + 9$

In Exercises 33–41, indicate whether the graph of each equation is a circle, an ellipse, a hyperbola, or a parabola. Then graph the conic section.

33. $5x^2 + 5y^2 = 180$

34. $4x^2 + 9y^2 = 36$

35. $4x^2 - 9y^2 = 36$

36. $\dfrac{x^2}{25} + \dfrac{y^2}{1} = 1$
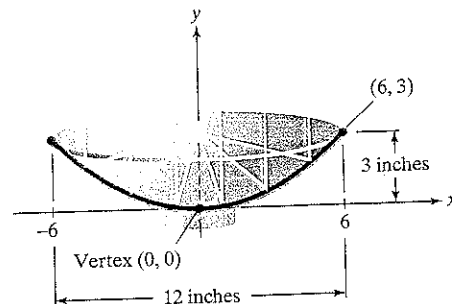
37. $x + 3 = -y^2 + 2y$

38. $y - 3 = x^2 - 2x$

39. $\dfrac{(x+2)^2}{16} + \dfrac{(y-5)^2}{4} = 1$

40. $(x-3)^2 + (y+2)^2 = 4$

41. $x^2 + y^2 + 6x - 2y + 6 = 0$

42. An engineer is designing headlight units for automobiles. The unit has a parabolic surface with a diameter of 12 inches and a depth of 3 inches. The situation is illustrated in the figure, where a coordinate system has been superimposed.

a. Use the point $(6, 3)$ to write an equation in the form $y = ax^2$ for the parabola used to design the headlight.

b. The light source should be placed at the focus $(0, p)$. The value of p is given by the equation $a = \dfrac{1}{4p}$. Where should the light source be placed? Describe this placement relative to the vertex.

10.5 *In Exercises 43–53, solve each system by the method of your choice.*

43. $5y = x^2 - 1$
    $x - y = 1$

44. $y = x^2 + 2x + 1$
    $x + y = 1$

45. $x^2 + y^2 = 2$
    $x + y = 0$

46. $2x^2 + y^2 = 24$
    $x^2 + y^2 = 15$

47. $xy - 4 = 0$
    $y - x = 0$

48. $y^2 = 4x$
    $x - 2y + 3 = 0$

49. $x^2 + y^2 = 10$
    $y = x + 2$

50. $xy = 1$
    $y = 2x + 1$

51. $x + y + 1 = 0$
    $x^2 + y^2 + 6y - x = -5$

52. $x^2 + y^2 = 13$
    $x^2 - y = 7$

53. $2x^2 + 3y^2 = 21$
    $3x^2 - 4y^2 = 23$

54. The perimeter of a rectangle is 26 meters and its area is 40 square meters. Find its dimensions.