Practice and Apply

Homework Help

For Exercises	See Examples
12–15, 35	1
16–34	1–3
36–41	2–4
42–45	4a

Extra Practice

See page 845.

Write each equation in standard form.

12. $y = x^2 - 6x + 11$
13. $x = y^2 + 14y + 20$
14. $y = \frac{1}{2}x^2 + 12x - 8$
15. $x = 3y^2 + 5y - 9$

Identify the coordinates of the vertex and focus, the equations of the axis of symmetry and directrix, and the direction of opening of the parabola with the given equation. Then find the length of the latus rectum and graph the parabola.

16. $-6y = x^2$
17. $y^2 = 2x$
18. $3(y - 3) = (x + 6)^2$
19. $-2(y - 4) = (x - 1)^2$
20. $4(x - 2) = (y + 3)^2$
21. $(y - 8)^2 = -4(x - 4)$
22. $y = x^2 - 12x + 20$
23. $x = y^2 - 14y + 25$
24. $x = 5y^2 + 25y + 60$
25. $y = 3x^2 - 24x + 50$
26. $y = -2x^2 + 5x - 10$
27. $x = -4y^2 + 6y + 2$
28. $y = \frac{1}{2}x^2 - 3x + \frac{19}{2}$
29. $x = -\frac{1}{3}y^2 - 12y + 15$

For Exercises 30–34, use the equation $x = 3y^2 + 4y + 1$.

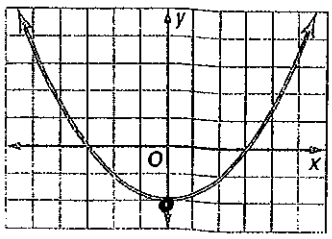
30. Draw the graph.
31. Find the x-intercept(s).
32. Find the y-intercept(s).
33. What is the equation of the axis of symmetry?
34. What are the coordinates of the vertex?

35. **MANUFACTURING** The reflective surface in a flashlight has a parabolic cross section that can be modeled by $y = \frac{1}{3}x^2$, where x and y are in centimeters. How far from the vertex should the filament of the light bulb be located?

Write an equation for each parabola described below. Then draw the graph.

36. vertex (0, 1), focus (0, 5)
37. vertex (8, 6), focus (2, 6)
38. focus (−4, −2), directrix $x = -8$
39. vertex (1, 7), directrix $y = 3$
40. vertex (−7, 4), axis of symmetry $x = -7$, measure of latus rectum 6, $a < 0$
41. vertex (4, 3), axis of symmetry $y = 3$, measure of latus rectum 4, $a > 0$

42. Write an equation for the graph at the right.



43. **BRIDGES** The Bayonne Bridge connects Staten Island, New York, to New Jersey. It has an arch in the shape of a parabola that opens downward. Write an equation of a parabola to model the arch, assuming that the origin is at the surface of the water, beneath the vertex of the arch.