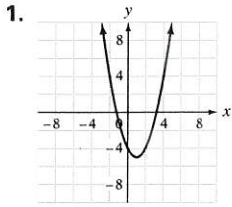
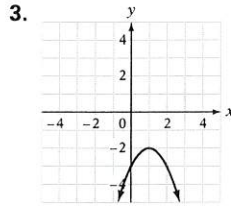
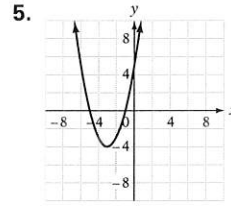
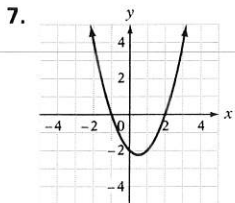
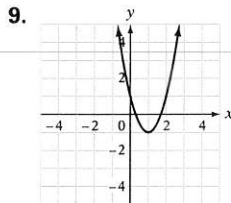
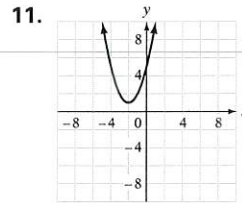
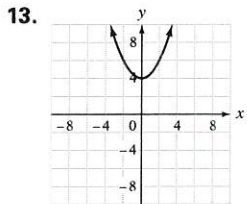
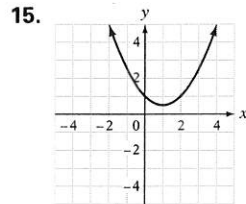
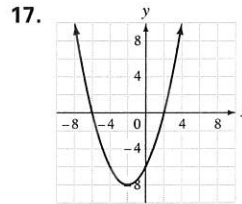


Answers to Chapter 9 Odd-Numbered Exercises

SECTION 9.1

Vertex: $(1, -5)$ Axis of symmetry: $x = 1$ Vertex: $(1, -2)$ Axis of symmetry: $x = 1$ Vertex: $(-3, -4)$ Axis of symmetry: $x = -3$ Vertex: $\left(\frac{1}{2}, -\frac{9}{4}\right)$ Axis of symmetry: $x = \frac{1}{2}$ Vertex: $(1, -1)$ Axis of symmetry: $x = 1$ Vertex: $(-2, 1)$ Axis of symmetry: $x = -2$ Vertex: $(0, 4)$ Axis of symmetry: $x = 0$ Vertex: $\left(1, \frac{1}{2}\right)$ Axis of symmetry: $x = 1$ Vertex: $(-2, -8)$ Axis of symmetry: $x = -2$

19. $(2, 0)$ and $(-2, 0)$ 21. $(0, 0)$ and $(2, 0)$ 23. $(2, 0)$ and $(-1, 0)$ 25. $\left(-\frac{1}{2}, 0\right)$ and $(1, 0)$

27. $(-1 + \sqrt{2}, 0)$ and $(-1 - \sqrt{2}, 0)$ 29. No x -intercepts 31. $(1 + \sqrt{3}, 0)$ and $(1 - \sqrt{3}, 0)$

33. $(2 + \sqrt{5}, 0)$ and $(2 - \sqrt{5}, 0)$ 35. 3 37. $\frac{3 + \sqrt{41}}{2}$ and $\frac{3 - \sqrt{41}}{2}$ 39. 0 and $\frac{4}{3}$ 41. $i\sqrt{2}$ and $-i\sqrt{2}$

43. $\frac{1}{6} + \frac{\sqrt{47}}{6}i$ and $\frac{1}{6} - \frac{\sqrt{47}}{6}i$

45. $\frac{1 + \sqrt{41}}{4}$ and $\frac{1 - \sqrt{41}}{4}$

47. Two x -intercepts

49. Two x -intercepts

51. One x -intercept

53. No x -intercepts

55. No x -intercepts

57. No x -intercepts

59. No x -intercepts

61. minimum, 2

63. maximum, -1

65. minimum, -2

67. maximum, -3

69. minimum, $-\frac{73}{8}$

71. minimum, $-\frac{11}{4}$

73. maximum, $-\frac{2}{3}$

75. minimum, $-\frac{1}{12}$

77. The maximum height is 13.1 m.

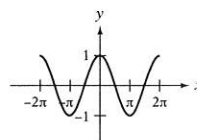
79. The minimum height of the cable is 24.36 ft.

81. The minimum thickness is 20.21 in.

83. Yes. The ball will

clear the fence. 85. The dimensions are $1\frac{3}{4}$ ft by $2\frac{1}{3}$ ft.

89.



93a. $y = (x - 2)^2 + 3; (2, 3)$ **b.** $y = (x - 1)^2 - 3; (1, -3)$ **c.** $y = (x - 3)^2 - 6; (3, -6)$

d. $y = (x + 2)^2 - 5; (-2, -5)$ **e.** $y = \left(x + \frac{1}{2}\right)^2 + \frac{7}{4}; \left(-\frac{1}{2}, \frac{7}{4}\right)$ **f.** $y = \left(x - \frac{1}{2}\right)^2 - \frac{13}{4}; \left(\frac{1}{2}, -\frac{13}{4}\right)$