

Answers for 4.5

For use with pages 269–274

4.5 Skill Practice

1. radicand
2. eliminating the radical from the denominator
3. $2\sqrt{7}$
4. $8\sqrt{3}$
5. $5\sqrt{6}$
6. 9
7. 24
8. $60\sqrt{15}$
9. $\frac{\sqrt{5}}{4}$
10. $\frac{\sqrt{35}}{6}$
11. $\frac{8\sqrt{3}}{3}$
12. $\frac{7\sqrt{3}}{6}$
13. $\frac{3\sqrt{22}}{11}$
14. $\frac{\sqrt{91}}{14}$
15. $-\sqrt{3} - 1$
16. $\frac{-\sqrt{6} + 5}{19}$
17. $\frac{4\sqrt{2} - \sqrt{10}}{11}$
18. $-\frac{\sqrt{70} + 3\sqrt{10} + 2\sqrt{7} + 6}{6}$
19. C
20. 4 is not the largest perfect square to divide evenly into 96;
 $\sqrt{96} = \sqrt{16} \cdot \sqrt{6} = 4\sqrt{6}$.
21. The equation has two solutions;
 $x^2 = 81, x = \pm 9$.
22. ± 13
23. $\pm 5\sqrt{2}$
24. $\pm 2\sqrt{21}$
25. ± 5
26. $\pm 4\sqrt{7}$
27. $\pm \sqrt{71}$
28. $\pm \sqrt{5}$
29. ± 10
30. $\pm 2\sqrt{35}$
31. $1 \pm \sqrt{2}$

32. 2, 6

33. $-2 \pm \frac{\sqrt{26}}{2}$

34. C

35. Factor: $x^2 - 4 = 0$,
 $(x + 2)(x - 2) = 0, x = -2$ or
 $x = 2$; solve the equation:
 $x^2 - 4 = 0, x^2 = 4, x = \pm 2$.

36. a. Sample answer: $x^2 = 31$

b. $x^2 = 0$

c. Sample answer: $x^2 = -12$

37. $-b \pm \sqrt{\frac{c}{a}}$

4.5 Problem Solving

38. $h = -16t^2 + 40$; about 1.6 sec

39. Earth: about 3.1 sec,
Mars: 5 sec,
Jupiter: about 2.0 sec,
Saturn: about 3.2 sec,
Pluto: about 12.2 sec

40. Sample answer: The wind speed required to generate a 20 foot wave is twice as fast as the wind speed needed to generate a 5 foot wave.

41. a. $\pi r^2 = 100$

b. about 5.6 ft

c. $\sqrt{\frac{s^2}{\pi}}; s^2 = \pi r^2, \frac{s^2}{\pi} = r^2,$

$$\sqrt{\frac{s^2}{\pi}} = r$$

Answers for 4.5 *continued*

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42. a. about 24.6 mi/h

b. The air resistance quadruples. Replace s with $2s$ (double the cyclist's speed):

$$R = 0.00829(2s)^2 \\ = 0.00829(4s^2) = (0.00829s^2).$$

43. $(-\sqrt{h_0} \pm \sqrt{h}) \left(\frac{-\ell w}{2\pi d^2 \sqrt{3}} \right)$

4.5 Mixed Review

44. 25 **45.** 16 **46.** 64

47. 169 **48.** -9 **49.** -121

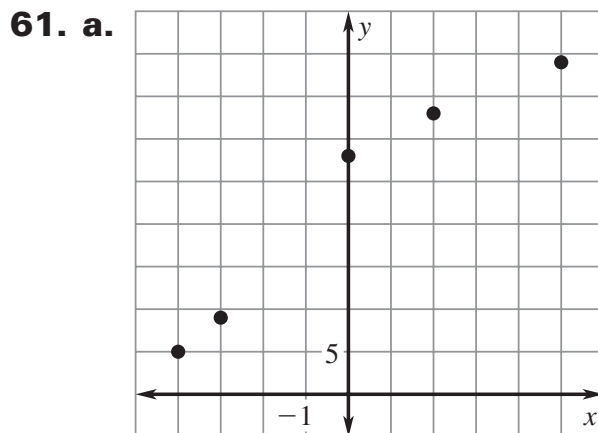
50. -225 **51.** -49 **52.** 10

53. 3 **54.** -1 **55.** $x > -4$

56. $x \leq -3$ **57.** $x \leq 5$

58. -17, -7 **59.** $-2\frac{2}{3}, 4$

60. $x \leq -26$ or $x \geq -10$

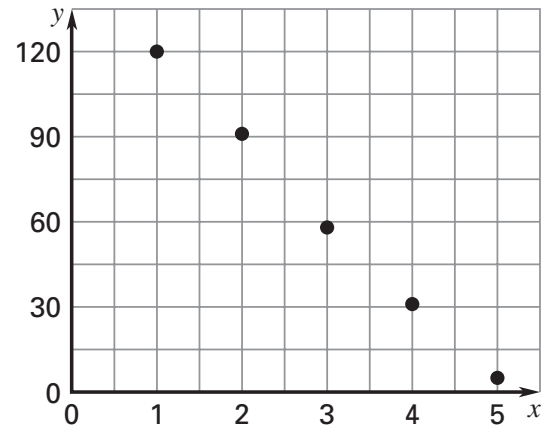


b. *Sample answer:*

$$y = 4.0x + 22.8$$

c. 102.8

62 a.



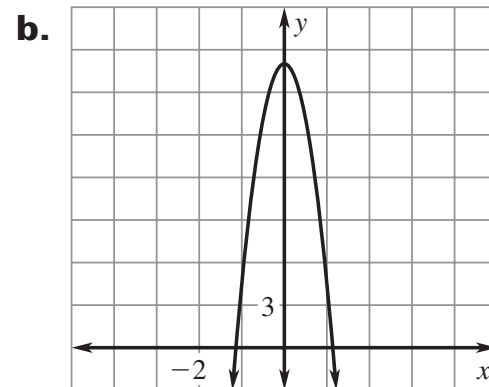
b. *Sample answer:*

$$y = -29x + 148$$

c. -482

4.1–4.5 Mixed Review of Problem Solving

1. a. $h = -16t^2 + 20$



c. about 1.1 sec

d. domain: $0 \leq x \leq 1.1$,
range: $0 \leq y \leq 20$

Answers for 4.5 *continued*

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- 2. a.** domain: $0 \leq x \leq 143.9$,
range: $0 \leq y \leq 18.1$
- b.** 143.9 ft
- c.** about 18.1 ft
- 3. a.** $w = \frac{4h}{3}$
- b.** $15^2 = \left(\frac{4h}{3}\right)^2 + h^2$
- c.** 9 in.; it is impossible to have a negative length.
- d.** 9 in., 12 in., 108 in.²
- 4.** $(20 + 2x)(24 + 2x) - 20(24) = 416$; 4; width: 28 in.; no, doubling the width would require 4 times as much metal.
- 5. a.** $R(x) = (2 + 0.25x)(80 - 5x)$
- b.** 4; increasing the price by $0.25(4) = \$1$ will maximize profits.
- c.** $R(x) = (2 - 0.25x)(80 + 5x)$; -4; the expanded form of the function is
- $$R(x) = -\frac{5}{4}x^2 - 10x + 160.$$
- Since both terms containing an x are negative, any positive value of x will decrease the revenue.

6. 6 ft;

			6
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<input type="radio"/>	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

7. Sample answer:

$$y = 3x^2 + 18x + 29,$$

$$y = -x^2 - 6x - 7,$$

$$y = -2x^2 - 12x - 16$$