Answers for Lesson 5-8 Exercises

1. $1, 3$

2. $-6, -2$

3. $-\frac{7}{2}, 1$

4. $-1, \frac{1}{3}$

5. -5

6. $-\frac{5}{2}, 1$

7. $\frac{3 \pm \sqrt{5}}{2}$

8. $-3 \pm \sqrt{14}$

9. $\frac{2 \pm \sqrt{10}}{3}$

10. $-\frac{1}{2}, \frac{3}{4}$

11. $1, 4$

12. $-\frac{5}{3}, \frac{1}{3}$

13. $3 \pm i\sqrt{2}$

14. $1 \pm 2i$

15. $-\frac{3}{2} \pm \frac{i\sqrt{11}}{2}$

16. $-2 \pm i\sqrt{2}$

17. $1 \pm i\sqrt{2}$

18. $-\frac{2}{3} - \frac{i\sqrt{26}}{3}$

19. $\frac{5}{2} \pm \frac{i\sqrt{3}}{2}$

20. $\frac{7}{4} \pm \frac{i\sqrt{15}}{4}$

21. $-\frac{1}{15} \pm \frac{i\sqrt{14}}{15}$

22. $-\frac{1}{2}, 3$

23. $\frac{5}{3} \pm \frac{\sqrt{10}}{3}$; $0.61, 2.72$

24. $-\frac{2}{3} \pm \frac{\sqrt{13}}{3}$; $-1.87, 0.54$

25. $-\frac{1}{6}, 1$

26. $\frac{1}{14} \pm \frac{\sqrt{337}}{14}$ $-1.24, 1.38$

27. $-\frac{4}{5} \pm \frac{\sqrt{71}}{5}$ $-2.49, 0.89$

28. $-\frac{1}{2} \pm \frac{\sqrt{23}}{2}$ $-2.90, 1.90$

29. $\frac{5}{4} \pm \frac{\sqrt{33}}{4}$ $-0.19, 2.69$

30. $-\frac{1}{4} \pm \frac{\sqrt{5}}{4}$; $-0.81, 0.31$

31. -4; two, imaginary

32. 36; two, real

33. 0; one, real

34. -223; two, imaginary

35. 169; two, real

36. -116; two, imaginary

37. 1; two, real

38. 0; one, real

39. 0; one, real

40. no

41. $1, 10$

42. $0, 42$

43. $-\frac{3}{2}, \frac{1}{2}$

44. $-3.45, 1.45$

45. $1 \pm i$

46. $-1.70, 4.70$

47. $-7, 7$

48. $-8.47, 0.47$

49. $3 \pm i\sqrt{2}$

50. $-\frac{1}{2}, \frac{3}{2}$

51. $-1, 6$

52. $-5.41, 2.41$

53. **a.** $w(18 - w) = 36$

b. 2.29 in. by 15.71 in.

54. 3 or $-\frac{11}{3}$

55. Answers may vary. Sample: Assume the coefficients are real numbers. If the discriminant is negative, then there are 2 imaginary solutions. If the discriminant is 0, then there is 1 real solution. If the discriminant is positive, then there are 2 real solutions.

56. **a.** Answers may vary. Sample:
Graph $y = 0.0721x^2 - 2.8867x + 117.061$ and $y = 100$. Where they intersect is the year when 100 million tons were released in the air.
Wherever $y = 0.0721x^2 - 2.8867x + 117.061$ is below $y = 100$ is where less than 100 million tons were released.

b. Answers may vary. Sample:
Where $y = 0.0721x^2 - 2.8867x + 117.061 < 100$ is the solution. Subtract 100 from both sides and you get $y = 0.0721x^2 - 2.8867x + 17.061 < 0$. You then use the quadratic formula to solve.

c. Check students' work.

57. two **58.** one **59.** none

60. two **61.** two **62.** two

63. **a.** 12 or -12

b. k such that $|k| < 12$

c. k such that $|k| > 12$

64. **a.** k such that $|k| < 6$

b. k such that $|k| > 6$

c. $6, -6$

65. Imaginary solutions always come in pairs because they are the positive and negative solution of the square root of a negative number.

66. **a.** II

b. III

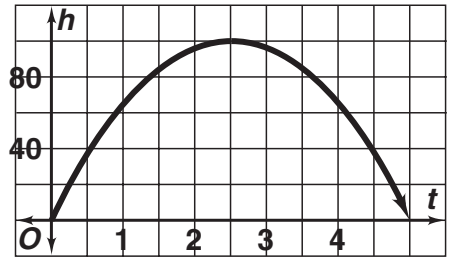
c. I

67. **a.** $x^2 = 100\pi$

b. 17.72 cm

68. **a.** yes

b.



c. $0 < t < 5$

69. Answers may vary. Sample: $x^2 - 3x + 1 = 0$

70. Answers may vary. Sample: $x^2 + 5x + 3 = 0$

71. Answers may vary. Sample: $x^2 - 5x + 7 = 0$

72. $\frac{3 \pm i}{2a}$ **73.** $\frac{5 \pm \sqrt{85}}{5a}$ **74.** $-a \pm a\sqrt{26}$

75. **a.** $\frac{-b + \sqrt{b^2 - 4ac}}{2a} + \frac{-b - \sqrt{b^2 - 4ac}}{2a} = \frac{-2b}{2a} = -\frac{b}{a}$

b. $\left(\frac{-b}{2a} + \frac{\sqrt{b^2 - 4ac}}{2a}\right) \times \left(\frac{-b}{2a} - \frac{\sqrt{b^2 - 4ac}}{2a}\right) =$
$\left(\frac{-b}{2a}\right)^2 - \left(\frac{\sqrt{b^2 - 4ac}}{2a}\right)^2 = \frac{4ac}{4a^2} = \frac{c}{a}$