Alg 2- 3.3 HW Answer Key

1. $\left(\frac{b}{2}\right)^2$

2. perfect square trinomial; $(x - 3)^2$

3. $x = 9$ and $x = -1$

4. $r = 4$ and $r = 6$

5. $x = 9 \pm \sqrt{5}$

6. $m = -4 \pm 3\sqrt{5}$

7. $y = 12 \pm 10i$

8. $x = 13 \pm i\sqrt{13}$

9. $w = \frac{-1 \pm 5\sqrt{3}}{2}$

10. $x = \frac{3}{2}$ and $x = \frac{1}{2}$

11. $25; (x + 5)^2$

12. $100; (x + 10)^2$

13. $36; (y - 6)^2$

14. $121; (t - 11)^2$

15. $9; (x - 3)^2$

16. $144; (x + 12)^2$

17. $\frac{25}{4}; \left(z - \frac{5}{2}\right)^2$

18. $\frac{81}{4}; \left(x + \frac{9}{2}\right)^2$

19. $\frac{169}{4}; \left(w + \frac{13}{2}\right)^2$

20. $169; (s - 13)^2$

21. $4; x^2 + 4x + 4$

22. $64; x^2 + 16x + 64$

23. $36; x^2 + 12x + 36$

24. $100; x^2 + 20x + 100$

25. $x = -3 \pm \sqrt{6}$

26. $s = -1 \pm \sqrt{7}$

27. $x = -2 \pm \sqrt{6}$

28. $t = 4 \pm \sqrt{21}$

29. $z = \dfrac{-9 \pm \sqrt{85}}{2}$

30. $x = -4 \pm 2i$

31. $t = -2 \pm 2i$

32. $r = \dfrac{-1 \pm i\sqrt{7}}{2}$

33. $x = -3 \pm i$

34. $w = \dfrac{3 \pm \sqrt{33}}{2}$

35. $x = 5 \pm 2\sqrt{7}$

36. $s = -1 \pm i\sqrt{2}$

37. 36 should have been added to the right side of the equation instead of 9; $4x^2 + 24x - 11 = 0$; $4(x^2 + 6x) = 11$; $4(x^2 + 6x + 9) = 11 + 36$; $4(x + 3)^2 = 47$; $(x + 3)^2 = \frac{47}{4}$; $x + 3 = \frac{\pm\sqrt{47}}{2}$; $x = -3 \pm \frac{\sqrt{47}}{2}$; $x = \frac{-6 \pm \sqrt{47}}{2}$

38. The number was not squared before being introduced into the expression; $x^2 + 30x + c$; $x^2 + 30x + \left(\frac{30}{2}\right)^2$; $x^2 + 30x + 225$

39. yes; All of the steps would be the same as with two real solutions, with the exception of the constant being negative when you take the square root.

40. E and F; $x^2 - 2ax + a^2 = b^2$; $(x - a)^2 = b^2$; $x - a = \pm b$; $x = a \pm b$

41. factoring; The equation can be factored; $x = 7$ and $x = -3$

42. factoring; The equation can be factored; $x = -11$ and $x = -2$

43. square roots; The equation can be written in the form $u^2 = d$; $x = -8$ and $x = 0$

44. square roots; The equation can be written in the form $u^2 = d$; $x = 10$ and $x = 4$

45. factoring; The equation can be factored; $x = -6$

46. factoring; The equation can be factored; $x = 8$

47. completing the square; The equation cannot be factored or written in the form $u^2 = d$; $x = -1 \pm \frac{\sqrt{10}}{2}$

48. completing the square; The equation cannot be factored or written in the form $u^2 = d$; $x = -2 \pm \frac{\sqrt{33}}{3}$

49. square roots; The equation can be written in the form $u^2 = d$; $x = \pm 10$

50. square roots; The equation can be written in the form $u^2 = d$; $x = \pm\sqrt{5}$

51. $x = -5 + 5\sqrt{3}$

52. $x = -3 + \sqrt{57}$

53. $x = -2 + 2\sqrt{21}$

54. $x = -1 + \sqrt{11}$

55. $f(x) = (x - 4)^2 + 3$; $(4, 3)$

56. $g(x) = (x - 2)^2 - 5$; $(2, -5)$

57. $g(x) = (x + 6)^2 + 1$; $(-6, 1)$

58. $h(x) = (x + 10)^2 - 10$; $(-10, -10)$

59. $h(x) = (x + 1)^2 - 49$; $(-1, -49)$

60. $f(x) = (x + 3)^2 - 25$; $(-3, -25)$

61. $f(x) = \left(x - \frac{3}{2}\right)^2 + \frac{7}{4}$; $\left(\frac{3}{2}, \frac{7}{4}\right)$

62. $g(x) = \left(x + \frac{7}{2}\right)^2 - \frac{41}{4}$; $\left(-\frac{7}{2}, -\frac{41}{4}\right)$

63. **a.** 22 ft

b. about 2.1 sec

64. 510 ft; 3 sec

65. **a.** \$3600

b. $y = -(x - 10)^2 + 3600$

c. *Sample answer:* vertex form; The vertex of the graph gives the maximum value.

66. -3; Substitute the point $(0, 9)$ into the function and solve for h.

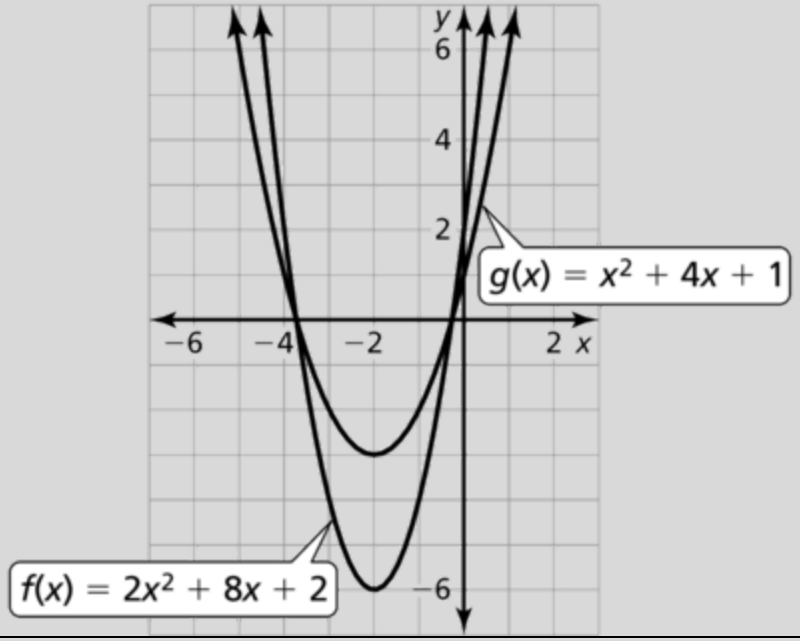
67. *Sample answer:* Complete the square to find the vertex. Factor it into intercept form to find the two roots, find their average to obtain the time when the water reaches its maximum height, and then substitute the time into the function. Use the coefficients of the original function $y = f(x)$ to find the maximum height, $f\left(-\frac{b}{2a}\right)$; 125.44 ft

68. **a.** $x(120 - 2x) = 1512$

b. 42 ft by 36 ft

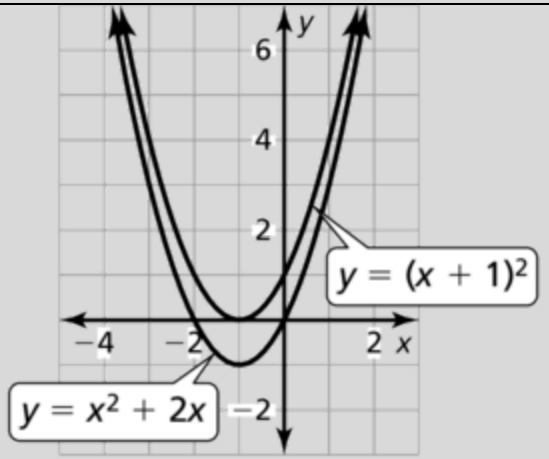
69. no; The problem cannot be solved by factoring because the answers are not rational.

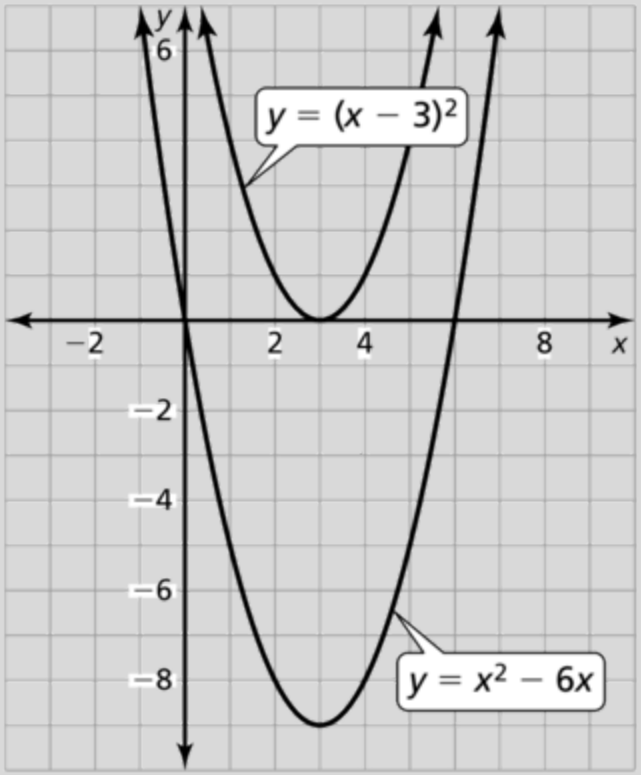
70. *Sample answer:* $g(x) = x^2 + 4x + 1$; $x = -2 \pm \sqrt{3}$; *Sample answer:*



71. $x = \dfrac{-b \pm \sqrt{b^2 - 4c}}{2}$

72. a.

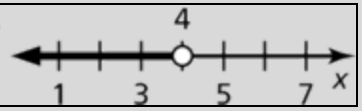




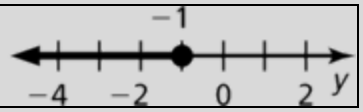
b. The graph is shifted vertically, but the axis of symmetry does not change.

73. $x \approx 0.896$ cm

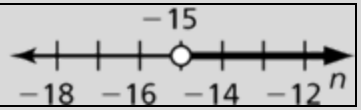
74. $x < 4$



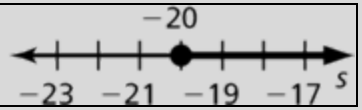
75. $y \leq -1$



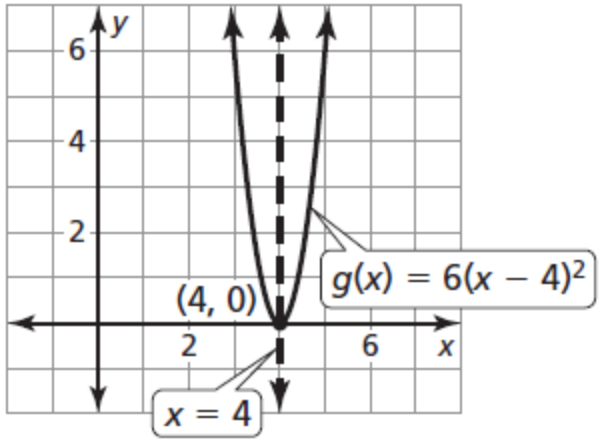
76. $n > -15$



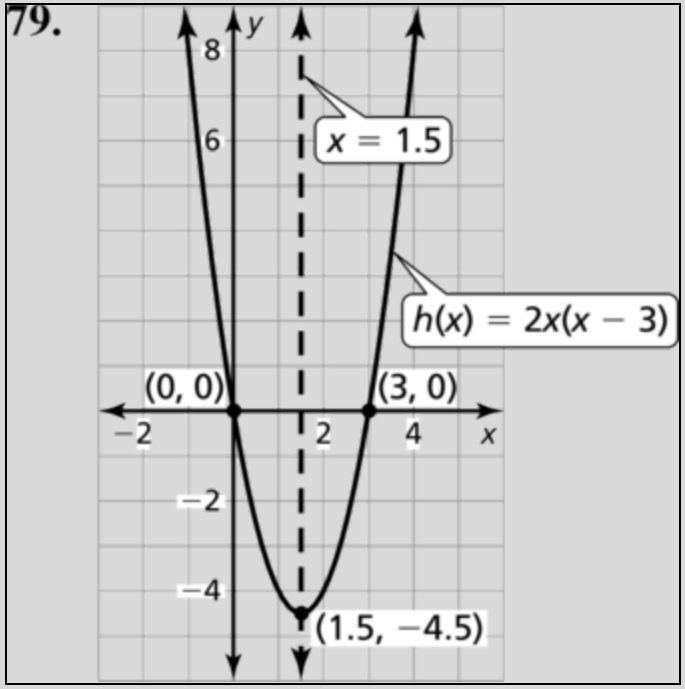
77. $s \geq -20$



78.



79.



80.

