6.1 Exercises

Solve each equation. (All the solutions for these equations are real numbers.) See Examples 1 and 2.

1. $b^2 = 49$ **2.** $n^2 = 100$ **3.** $t^2 = 13$

4. $y^2 = 11$ **5.** $k^2 = 12$ **6.** $w^2 = 18$

7. $(x - 2)^2 = 4$ **8.** $(m + 3)^2 = 16$ **9.** $(p + 6)^2 = 9$

10. $(q - 2)^2 = 25$ **11.** $(3a - 1)^2 = 3$ **12.** $(2x + 4)^2 = 5$

13. $(4p + 1)^2 = 12$ **14.** $(5k - 2)^2 = 24$

Find the imaginary number solutions of the following equations. See Example 3.

15. $m^2 = -9$ **16.** $r^2 = -144$ **17.** $a^2 = -72$ **18.** $p^2 = -18$

19. $(x - 5)^2 = -1$ **20.** $(z + 2)^2 = -2$ **21.** $(2m - 1)^2 = -3$ **22.** $(3k + 2)^2 = -5$

Decide what number must be added to each expression to make it a perfect square trinomial.

23. $p^2 + 6p$ **24.** $z^2 + 12z$ **25.** $y^2 - 10y$ **26.** $q^2 - 8q$

27. $r^2 - 5r$ **28.** $y^2 - 9y$ **29.** $x^2 + 11x$ **30.** $z^2 + 3z$

Solve each equation by completing the square. (All the solutions for these equations are real numbers.) See Example 4.

31. $p^2 - 2p - 3 = 0$ **32.** $y^2 + 2y - 8 = 0$

33. $x^2 - 2x - 15 = 0$ **34.** $m^2 - 4m = 32$

35. $2y^2 + y = 15$ **36.** $2z^2 - 7z = 15$

37. $2m^2 + 5m - 3 = 0$ **38.** $3a^2 + 2a = 1$

39. $x^2 - 2x - 1 = 0$ **40.** $p^2 - 4p + 1 = 0$

41. $m^2 = -6m - 7$ **42.** $r^2 + 8r + 14 = 0$

43. $r^2 - \frac{2}{3}r = \frac{1}{3}$ **44.** $y^2 + \frac{3}{2}y = \frac{9}{2}$

45. $q^2 + \frac{7}{2}q = 2$ **46.** $r^2 + \frac{4}{3}r = \frac{4}{3}$

Solve each equation by completing the square. (Some of these equations have imaginary number solutions.) See Examples 4 and 5.

47. $s^2 + 13 = 6s$ **48.** $m^2 + 2m + 2 = 0$ **49.** $9a^2 - 24a = -13$

50. $x^2 - x - 1 = 0$ **51.** $y^2 - \frac{4}{3}y = -\frac{1}{9}$ **52.** $x^2 - x = \frac{1}{2}$

53. $m^2 + 6m + 10 = 0$ **54.** $x^2 + 4x + 13 = 0$ **55.** $25m^2 - 20m - 1 = 0$

56. $3p^2 + 3 = 8p$ **57.** $25y^2 + 46 = 70y$ **58.** $2y^2 - 4y = 5$

59. $4m^2 - 12m + 13 = 0$ **60.** $25p^2 - 50p + 29 = 0$ **61.** $9x^2 - 30x + 29 = 0$

Solve for x. Assume that a and b represent positive real numbers.

62. $x^2 = 4b$ **63.** $x^2 - b = 0$ **64.** $9x^2 - 25a = 0$

65. $4x^2 = b^2 + 16$ **66.** $x^2 - a^2 - 36 = 0$ **67.** $(5x - 2b)^2 = 3a$

68. $(2x + 3a)^2 = 4b$ **69.** $(3x + 7b)^2 = 25$ **70.** $(4x - a)^2 = 1$

CHAPTER 6

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1. $\{-7, 7\}$ **3.** $\{-\sqrt{13}, \sqrt{13}\}$ **5.** $\{-2\sqrt{3}, 2\sqrt{3}\}$ **7.** $\{0, 4\}$ **9.** $\{-9, -3\}$

11. $\left\{\frac{1+\sqrt{3}}{3}, \frac{1-\sqrt{3}}{3}\right\}$ **13.** $\left\{\frac{-1+2\sqrt{3}}{4}, \frac{-1-2\sqrt{3}}{4}\right\}$ **15.** $\{-3i, 3i\}$

17. $\{-6i\sqrt{2}, 6i\sqrt{2}\}$ **19.** $\{5+i, 5-i\}$ **21.** $\left\{\left(\frac{1}{2}+\frac{\sqrt{3}}{2}i, \frac{1}{2}-\frac{\sqrt{3}}{2}i\right)\right\}$ **23.** 9

25. 25 **27.** 25/4 **29.** 121/4 **31.** $\{-1, 3\}$ **33.** $\{-3, 5\}$ **35.** $\{-3, 5/2\}$
37. $\{-3, 1/2\}$ **39.** $\{1+\sqrt{2}, 1-\sqrt{2}\}$ **41.** $\{-3+\sqrt{2}, -3-\sqrt{2}\}$ **43.** $\{-1/3, 1\}$

45. $\{-4, 1/2\}$ **47.** $\{3+2i, 3-2i\}$ **49.** $\left\{\frac{4+\sqrt{3}}{3}, \frac{4-\sqrt{3}}{3}\right\}$ **51.** $\left\{\frac{2+\sqrt{3}}{3}, \frac{2-\sqrt{3}}{3}\right\}$

53. $\{-3+i, -3-i\}$ **55.** $\left\{\frac{2+\sqrt{5}}{5}, \frac{2-\sqrt{5}}{5}\right\}$ **57.** $\left\{\frac{7+\sqrt{3}}{5}, \frac{7-\sqrt{3}}{5}\right\}$

59. $\left\{\frac{3}{2}+i, \frac{3}{2}-i\right\}$ **61.** $\left\{\frac{5}{3}+\frac{2}{3}i, \frac{5}{3}-\frac{2}{3}i\right\}$ **63.** $\{\sqrt{b}, -\sqrt{b}\}$

65. $\left\{\frac{\sqrt{b^2+16}}{2}, \frac{-\sqrt{b^2+16}}{2}\right\}$ **67.** $\left\{\frac{2b+\sqrt{3a}}{5}, \frac{2b-\sqrt{3a}}{5}\right\}$ **69.** $\left\{\frac{-7b+5}{3}, \frac{-7b-5}{3}\right\}$

71. $\sqrt{13}$ **73.** 29 **65.** $\sqrt{165}$