

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. $\frac{25}{4}$ 29. $\frac{121}{4}$ 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. $\sqrt{165}$