

Solving Quadratic Equations (ALG.QUAD.03)

Solve each equation by taking the square root.

1. $x^2 = 64$

2. $x^2 = 50$

3. $x^2 = -121$

4. $x^2 = -240$

5. $x^2 - 25 = 0$

6. $x^2 - 75 = 0$

7. $x^2 + 81 = 0$

8. $x^2 + 27 = 0$

9. $49x^2 - 16 = 0$

10. $25x^2 - 18 = 0$

11. $36x^2 + 169 = 0$

12. $75x^2 + 144 = 0$

13. $0.05x^2 - 5 = 0$

14. $\frac{5}{6}x^2 - 30 = 0$

15. $4.75x^2 + 684 = 0$

16. $\frac{7}{4}x^2 + 343 = 0$

Solve each equation by factoring.

17. $x^2 + 9x + 20 = 0$

18. $x^2 - 13x + 40 = 0$

19. $x^2 + 8x + 16 = 0$

20. $x^2 - 10x + 25 = 0$

21. $x^2 - 2x - 15 = 0$

22. $x^2 + 4x - 21 = 0$

23. $-4x^2 + 4x + 8 = 0$

24. $10x^2 + 19x + 6 = 0$

25. $14x^2 = 35 + 39x$

26. $6x^3 + 5x^2 = 6x$

27. $9x^2 + 16 = 24x$

28. $3x^2 = x + 14$

29. $100x - 4x^3 = 0$

30. $-5x^2 + 45 = 0$

31. $10x^3 + 48x^2 = 10x$

32. $4x(x + 3) + 2(x - 2) + x = 0$

33. $5x(5x - 4) = 4(1 - 5x)$

34. $(x + 1)(x - 1) = 5(x + 1)$

35. $(x - 2)^2(x + 1) = x(x + 3)^2$

36. $-x^2(x^2 - 2) = 2x^4 + 5x^2(x - 2)$

37. $3x(3x + 5) - 7 = -x(x + 6) + 3$

38. $(5x + 2)(2x - 3) = 2(2x - 1)(x - 2) + 5$

39. $4x(x^2 + 4) + 5 = 5(4x^2 + 1) + 4x + x^3$

40. $(x + 3)^2 - (2x - 1)^2 = 0$

41. $4x(4x + 1) = 15(1 - 2x)$

42. $6(x + 1)^2 + 7x = -9$

43. $-x(x - 6)^2 + 3x(x + 4)(x - 3) - 5x^2 = 0$

44. $(x - 2)^3 + (x - 2)[(5x - 1) + (x - 3)] = 0$

45. $\frac{x+4}{3} = \frac{-3}{x-2}$

46. $\frac{2x^2}{3} = \frac{3}{2}$

47. $x = \frac{9}{6-x}$

48. $x = \frac{6}{x-5}$

49. $\frac{x+3}{-3x} = \frac{4}{x+7}$

50. $\frac{4x}{x+7} = \frac{10}{x-2}$

Write a quadratic function from the given set of roots.

51. $x = 2, 4$

52. $x = -3, 6$

53. $x = 5, -3$

54. $x = -5, -8$

55. $x = 0, 9$

56. $x = 0, -2$

57. $x = \pm 4$

58. $x = -\frac{1}{3}, \frac{1}{3}$

59. $x = 4, -\frac{1}{6}$

60. $x = \frac{1}{2}, \frac{5}{3}$

61. $x = -\frac{8}{3}, \frac{3}{5}$

62. $x = -\frac{5}{3}, -\frac{3}{5}$

63. For the equation, $x^2 + kx + 24 = 0$, what value(s) of k will result in integer solutions? Justify your answer.

64. For the equation, $x^2 + kx - 12 = 0$, what value(s) of k will result in integer solutions? Justify your answer.

65. For the equation, $x^2 + kx + 30 = 0$, what value(s) of k will result in whole number solutions? Justify your answer.

66. For the equation, $x^2 - kx + 16 = 0$, what value(s) of k will result in whole number solutions?

67. For the equation, $x^2 - 8x + k = 0$, what value of k will result in a single solution? What is the solution?

68. For the equation, $x^2 + 10x + k = 0$, what value of k will result in a single solution? What is the solution?

69. Describe and correct the error.

$$3(x + 2)^2 + 5 = 53$$

$$3(x + 2)^2 = 48$$

$$(x + 2)^2 = 16$$

$$x + 2 = 4$$

$$x = 2$$

71. A rectangle has a width of x units and a length $(x + 4)$ units. If the area is 32 square units, then determine the value of x and the perimeter of the rectangle.

73. The area of a circle is 81π square inches and the diameter is $(4x + 10)$ inches. Determine the value of x and the circumference of the circle.

75. The height of a triangle is $(x + 5)$ centimeters and its base length is $(3x + 8)$ centimeters. If the area of the triangle is 90 square centimeters, then determine the value of x and the dimensions of the triangle.

77. The difference of two integers is 25 and their product is -126 . Write and solve an equation to determine the two pairs of integers.

70. Describe and correct the error.

$$-7x^2 - 63 = 0$$

$$-7x^2 = 63$$

$$x^2 = -9$$

$$x = \pm 3$$

72. A rectangle has a perimeter of $(6x + 14)$ meters. If the width of the rectangle is $(2x + 1)$ meters and the area of the rectangle is 195 square meters, then determine the value of x and the dimensions of the rectangle.

74. The circumference of a circle is $(8x + 6)\pi$ yards. The area of the circle is 225π square yards. Determine the value of x and the radius of the circle.

76. The area of a trapezoid is 275 mm^2 . The lengths of the parallel sides are $(3x + 2)$ mm and $(2x + 3)$ mm. The height of the trapezoid is $(x + 2)$ mm. Determine the value of x and the dimensions of the trapezoid.

78. The sum of two integers is 42 and their product is 416. Write and solve an equation to determine the two integers.

Solve each equation by factoring. Use a u -substitution where $u = x^2$.

79. $x^4 - 13x^2 + 36 = 0$

80. $x^4 - 2x^2 + 1 = 0$

81. $x^4 - 9x^2 + 20 = 0$

82. $x^4 - 13x^2 + 30 = 0$

83. $36x^4 - 97x^2 + 36 = 0$

84. $2x^4 - 5x^2 + 2 = 0$

85. $9x^4 - 5x^2 - 4 = 0$

86. $x^4 + 13x^2 + 40 = 0$

