

# Quadratic Formula

$$ax^2 + bx + c = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Use the quadratic formula to find all real solutions of each equation.

1.  $x^2 + 7x + 10 = 0$

2.  $z^2 - z - 2 = 0$

3.  $t^2 + 9t + 14 = 0$

4.  $b^2 + 6b + 8 = 0$

5.  $y^2 + 2y + 1 = 0$

6.  $m^2 + 6m + 5 = 0$

7.  $m^2 - 8m + 15 = 0$

8.  $m^2 + 4m + 4 = 0$

9.  $t^2 - 7t + 10 = 0$

10.  $4 - 5x + x^2 = 0$

11.  $z^2 - 2z + 1 = 0$

12.  $r^2 - 14r + 49 = 0$

13.  $w^2 - 13 - 12w = 0$

14.  $x^2 - 4x - 21 = 0$

15.  $t^2 - 8t + 16 = 0$

16.  $a^2 + 5a + 6 = 0$

17.  $10y + 9 + y^2 = 0$

18.  $x^2 - 7x + 10 = 0$

19.  $x^2 + 10x + 25 = 0$

20.  $p^2 - 8p + 15 = 0$

21.  $x^2 + 6x + 5 = 0$

22.  $t^2 + 13t + 12 = 0$

23.  $t^2 - 9t + 14 = 0$

24.  $a^2 - a - 6 = 0$

25.  $28 + y^2 + 11y = 0$

26.  $a^2 - 6a + 9 = 0$

27.  $z^2 + 14z + 49 = 0$

28.  $a^2 + 4a - 45 = 0$

29.  $4y + y^2 - 5 = 0$

30.  $x^2 - 17x + 72 = 0$

31.  $64 + z^2 - 16z = 0$

32.  $x^2 + 20x + 100 = 0$

33.  $2y^2 + 5y = -2$

34.  $11b + 2b^2 + 12 = 0$

35.  $4m^2 - 25 = 0$

36.  $3a^2 - 5a = 2$

37.  $6b^2 + 7b - 20 = 0$

38.  $9z^2 - 6z + 1 = 0$

39.  $b^2 = 16$

40.  $3x^2 - 14x - 5 = 0$

41.  $-3 + 2z^2 - 5z = 0$

42.  $2m^2 + m - 15 = 0$

43.  $3w^2 - 75 = 0$

44.  $6x^2 + 7x + 2 = 0$

45.  $3r^2 + 7r = -2$

46.  $4y^2 + 5y + 1 = 0$

47.  $-3 + 2b^2 - b = 0$

48.  $3t^2 - 3t = 0$

49.  $2x^2 - 3x - 2 = 0$

50.  $4x^2 + 8x = -3$

51.  $12 - 25x + 12x^2 = 0$

52.  $12x^2 + 5x - 3 = 0$

53.  $4x^2 + 10x - 6 = 0$

54.  $9x^2 = -3x + 6$

55.  $2 + 2x^2 - 5x = 0$

56.  $2x^2 - 8 = 0$

57.  $3x^2 + 13x + 4 = 0$

58.  $6x^2 = -23x + 4$

59.  $2x^3 - 4x^2 + 2x = 0$

60.  $4r^2 + 4r - 15 = 0$

61.  $9x^2 + 30x + 25 = 0$

62.  $-5x^2 + x + 4 = 0$

63.  $-x^2 = 7x + 10$

# Quadratic Formula Solutions

$$1) x = \frac{-7 \pm \sqrt{7^2 - 4(1)(10)}}{2(1)} = \frac{-7 \pm \sqrt{49 - 40}}{2} = \frac{-7 \pm \sqrt{9}}{2} = \frac{-7 \pm 3}{2} = \begin{matrix} x = -2 \\ x = -5 \end{matrix}$$

$$2) x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-2)}}{2(1)} = \frac{1 \pm \sqrt{1 - (-8)}}{2} = \frac{1 \pm \sqrt{9}}{2} = \frac{1 \pm 3}{2} = \begin{matrix} x = 2 \\ x = -1 \end{matrix}$$

$$3) x = \frac{-9 \pm \sqrt{9^2 - 4(1)(14)}}{2(1)} = \frac{-9 \pm \sqrt{81 - 56}}{2} = \frac{-9 \pm \sqrt{25}}{2} = \frac{-9 \pm 5}{2} = \begin{matrix} x = -2 \\ x = -7 \end{matrix}$$

$$4) x = \frac{-6 \pm \sqrt{6^2 - 4(1)(8)}}{2(1)} = \frac{-6 \pm \sqrt{36 - 32}}{2} = \frac{-6 \pm \sqrt{4}}{2} = \frac{-6 \pm 2}{2} = \begin{matrix} x = -2 \\ x = -4 \end{matrix}$$

$$5) x = \frac{-2 \pm \sqrt{2^2 - 4(1)(1)}}{2(1)} = \frac{-2 \pm \sqrt{4 - 4}}{2} = \frac{-2 \pm 0}{2} = x = -1$$

$$6) x = \frac{-6 \pm \sqrt{6^2 - 4(1)(5)}}{2(1)} = \frac{-6 \pm \sqrt{36 - 20}}{2} = \frac{-6 \pm \sqrt{16}}{2} = \frac{-6 \pm 4}{2} = \begin{matrix} x = -1 \\ x = -5 \end{matrix}$$

$$7) x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(15)}}{2(1)} = \frac{8 \pm \sqrt{64 - 60}}{2} = \frac{8 \pm \sqrt{4}}{2} = \frac{8 \pm 2}{2} = \begin{matrix} x = 5 \\ x = 3 \end{matrix}$$

$$8) x = \frac{-4 \pm \sqrt{4^2 - 4(1)(4)}}{2(1)} = \frac{-4 \pm \sqrt{16 - 16}}{2} = \frac{-4 \pm 0}{2} = x = -2$$

$$9) x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(1)(10)}}{2(1)} = \frac{7 \pm \sqrt{49 - 40}}{2} = \frac{7 \pm \sqrt{9}}{2} = \frac{7 \pm 3}{2} = \begin{matrix} x = 2 \\ x = 5 \end{matrix}$$

$$10) x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(4)}}{2(1)} = \frac{5 \pm \sqrt{25 - 16}}{2} = \frac{5 \pm \sqrt{9}}{2} = \frac{5 \pm 3}{2} = \begin{matrix} x = 4 \\ x = 1 \end{matrix}$$

$$11) x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(1)}}{2(1)} = \frac{2 \pm \sqrt{4 - 4}}{2} = \frac{2 \pm 0}{2} = x = 1$$

$$12) x = \frac{-(-14) \pm \sqrt{(-14)^2 - 4(1)(49)}}{2(1)} = \frac{14 \pm \sqrt{196 - 196}}{2} = \frac{14 \pm 0}{2} = x = 7$$

$$13) x = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(1)(-13)}}{2(1)} = \frac{12 \pm \sqrt{144 + 52}}{2} = \frac{12 \pm \sqrt{196}}{2} = \frac{12 \pm 14}{2} = \begin{matrix} x = 12 \\ x = -1 \end{matrix}$$

# Quadratic Formula Solutions

$$14) x = 7, -3$$

$$15) t = 4$$

$$16) a = -2, -3$$

$$17) y = -1, -9$$

$$18) x = 5, 2$$

$$19) x = -5$$

$$20) p = 5, 3$$

$$21) x = -1, -5$$

$$22) x = -1, -12$$

$$23) t = 7, 2$$

$$24) a = 3, -2$$

$$25) y = -4, -7$$

$$26) a = 3$$

$$27) z = -7$$

$$28) a = 5, -9$$

$$29) y = 1, -5$$

$$30) x = 9, 8$$

$$31) z = 8$$

$$32) x = -10$$

$$33) y = -2, -\frac{1}{2}$$

$$34) b = -4, -\frac{3}{2}$$

$$35) m = -\frac{5}{2}, \frac{5}{2}$$

$$36) a = 2, -\frac{1}{3}$$

$$37) b = -\frac{5}{2}, \frac{4}{3}$$

$$38) z = \frac{1}{3}$$

$$39) b = -4, 4$$

$$40) x = 5, -\frac{1}{3}$$

$$41) z = 3, -\frac{1}{2}$$

$$42) m = -3, \frac{5}{2}$$

$$43) w = -5, 5$$

$$44) x = -\frac{1}{2}, -\frac{2}{3}$$

$$45) r = -2, -\frac{1}{3}$$

$$46) y = -1, -\frac{1}{4}$$

$$47) b = -1, \frac{3}{2}$$

$$48) t = 0, 1$$

$$49) x = 2, -\frac{1}{2}$$

$$50) x = -\frac{1}{2}, -\frac{3}{2}$$

$$51) x = \frac{4}{3}, \frac{3}{4}$$

$$52) x = \frac{1}{3}, -\frac{3}{4}$$

$$53) x = -3, \frac{1}{2}$$

$$54) x = -1, \frac{2}{3}$$

$$55) x = 2, \frac{1}{2}$$

$$56) x = -2, 2$$

$$57) x = -4, -\frac{1}{3}$$

$$58) x = -4, \frac{1}{6}$$

$$59) x = 0, 1$$

$$60) x = -\frac{5}{2}, \frac{3}{2}$$

$$61) x = -\frac{5}{3}$$

$$62) x = 1, -\frac{4}{5}$$

$$63) x = -2, -5$$