

SOLVING EQUATIONS Solve the equation.

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

4. $2x^2 - 32 = 0$

5. $4x^2 - 400 = 0$

6. $2m^2 - 42 = 8$

7. $15d^2 = 0$

8. $a^2 + 8 = 3$

9. $4g^2 + 10 = 11$

10. $2w^2 + 13 = 11$

11. $9q^2 - 35 = 14$

12. $25b^2 + 11 = 15$

13. $3z^2 - 18 = -18$

14. $5n^2 - 17 = -19$

15. **★ MULTIPLE CHOICE** Which of the following is a solution of the equation $61 - 3n^2 = -14$?

(A) 5

(B) 10

(C) 25

(D) 625

16. **★ MULTIPLE CHOICE** Which of the following is a solution of the equation $13 - 36x^2 = -12$?

(A) $-\frac{6}{5}$

(B) $\frac{1}{6}$

(C) $\frac{5}{6}$

(D) 5

APPROXIMATING SQUARE ROOTS Solve the equation. Round the solutions to the nearest hundredth.

17. $x^2 + 6 = 13$

18. $x^2 + 11 = 24$

19. $14 - x^2 = 17$

20. $2a^2 - 9 = 11$

21. $4 - k^2 = 4$

22. $5 + 3p^2 = 38$

23. $53 = 8 + 9m^2$

24. $-21 = 15 - 2z^2$

25. $7c^2 = 100$

26. $5d^2 + 2 = 6$

27. $4b^2 - 5 = 2$

28. $9n^2 - 14 = -3$

ERROR ANALYSIS Describe and correct the error in solving the equation.

30. $2x^2 - 54 = 18$

$$2x^2 - 54 = 18$$

$$2x^2 = 72$$

$$x^2 = 36$$

$$x = \sqrt{36}$$

$$x = 6$$

The solution is 6.



31. $7d^2 - 6 = -17$

$$7d^2 - 6 = -17$$

$$7d^2 = -11$$

$$d^2 = -\frac{11}{7}$$

$$d \approx \pm 1.25$$

The solutions are about -1.25
and about 1.25 .**SOLVING EQUATIONS** Solve the equation. Round the solutions to the nearest hundredth.

32. $(x - 7)^2 = 6$

33. $7(x - 3)^2 = 35$

34. $6(x + 4)^2 = 18$

35. $20 = 2(m + 5)^2$

36. $5(a - 2)^2 = 70$

37. $21 = 3(z + 14)^2$

38. $\frac{1}{2}(c - 8)^2 = 3$

39. $\frac{3}{2}(n + 1)^2 = 33$

40. $\frac{4}{3}(k - 6)^2 = 20$

SOLVING EQUATIONS Solve the equation. Round the solutions to the nearest hundredth, if necessary.

41. $3x^2 - 35 = 45 - 2x^2$

42. $42 = 3(x^2 + 5)$

43. $11x^2 + 3 = 5(4x^2 - 3)$

44. $\left(\frac{t - 5}{3}\right)^2 = 49$

45. $11\left(\frac{w - 7}{2}\right)^2 - 20 = 101$

46. $(4m^2 - 6)^2 = 81$

COMPLETING THE SQUARE Find the value of c that makes the expression a perfect square trinomial. Then write the expression as the square of a binomial.

3. $x^2 + 6x + c$

4. $x^2 + 12x + c$

5. $x^2 - 4x + c$

6. $x^2 - 8x + c$

7. $x^2 - 3x + c$

8. $x^2 + 5x + c$

9. $x^2 + 2.4x + c$

10. $x^2 - \frac{1}{2}x + c$

11. $x^2 - \frac{4}{3}x + c$

SOLVING EQUATIONS Solve the equation by completing the square. Round your solutions to the nearest hundredth, if necessary.

12. $x^2 + 2x = 3$

13. $x^2 + 10x = 24$

14. $c^2 - 14c = 15$

15. $n^2 - 6n = 72$

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

17. $y^2 + 4y - 21 = 0$

18. $w^2 - 5w = \frac{11}{4}$

19. $z^2 + 11z = -\frac{21}{4}$

20. $g^2 - \frac{2}{3}g = 7$

21. $k^2 - 8k - 7 = 0$

22. $v^2 - 7v + 1 = 0$

23. $m^2 + 3m + \frac{5}{4} = 0$

24. **★ MULTIPLE CHOICE** What are the solutions of $4x^2 + 16x = 9$?

Ⓐ $-\frac{1}{2}, -\frac{9}{2}$

Ⓑ $-\frac{1}{2}, \frac{9}{2}$

Ⓒ $\frac{1}{2}, -\frac{9}{2}$

Ⓓ $\frac{1}{2}, \frac{9}{2}$

25. **★ MULTIPLE CHOICE** What are the solutions of $x^2 + 12x + 10 = 0$?

Ⓐ $-6 \pm \sqrt{46}$

Ⓑ $-6 \pm \sqrt{26}$

Ⓒ $6 \pm \sqrt{26}$

Ⓓ $6 \pm \sqrt{46}$

SOLVING QUADRATIC EQUATIONS Use the quadratic formula to solve the equation. Round your solutions to the nearest hundredth, if necessary.

3. $x^2 + 5x - 104 = 0$

5. $6x^2 - 2x - 28 = 0$

7. $-z^2 + z + 14 = 0$

9. $4w^2 + 20w + 25 = 0$

11. $-6g^2 + 9g + 8 = 0$

SOLVING QUADRATIC EQUATIONS Use the quadratic formula to solve the equation. Round your solutions to the nearest hundredth, if necessary.

13. $x^2 - 5x = 14$

15. $9 = 7x^2 - 2x$

17. $-10 = r^2 - 10r + 12$

19. $6z^2 = 2z^2 + 7z + 5$

21. $4t^2 - 3t = 5 - 3t^2$

23. $7n + 5 = -3n^2 + 2$

25. **★ MULTIPLE CHOICE** What are the solutions of $x^2 + 14x = 2x - 11$?

(A) -2 and -22

(B) -1 and -11

(C) 1 and 11

(D) 2 and 22

ERROR ANALYSIS Describe and correct the error in solving the equation.

27. $-2x^2 + 3x = 1$

$$x = \frac{-3 \pm \sqrt{3^2 - 4(-2)(1)}}{2(-2)}$$

$$= \frac{-3 \pm \sqrt{17}}{-4}$$

$$x \approx -0.28 \text{ and } x \approx 1.78$$



CHOOSING A METHOD Tell what method(s) you would use to solve the quadratic equation. Explain your choice(s).

29. $5x^2 = 25$

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

33. $-10g^2 + 13g = 4$


SOLVING QUADRATIC EQUATIONS Solve the quadratic equation using any method. Round your solutions to the nearest hundredth, if necessary.

35. $x^2 - 8x = -16$

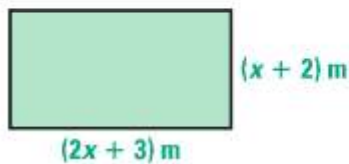
37. $x^2 = 12x - 36$

39. $-4x^2 + x = -17$

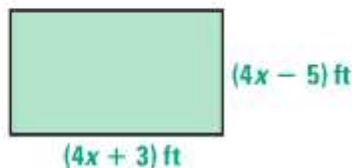
41. $-2x^2 + 5 = 3x^2 - 10x$

 **GEOMETRY** Use the given area A of the rectangle to find the value of x . Then give the dimensions of the rectangle.

43. $A = 91 \text{ m}^2$




44. $A = 209 \text{ ft}^2$



46. **ADVERTISING** For the period 1990–2000, the amount of money y (in billions of dollars) spent on advertising in the U.S. can be modeled by the function $y = 0.93x^2 + 2.2x + 130$ where x is the number of years since 1990. In what year was 164 billion dollars spent on advertising?

47. **CELL PHONES** For the period 1985–2001, the number y (in millions) of cell phone service subscribers in the U.S. can be modeled by the function $y = 0.7x^2 - 4.3x + 5.5$ where x is the number of years since 1985. In what year were there 16,000,000 cell phone service subscribers?

49.  **MULTIPLE REPRESENTATIONS** For the period 1997–2002, the number y (in thousands) of 16- and 17-year-olds employed in the United States can be modeled by the function $y = -46.7x^2 + 169x + 2650$ where x is the number of years since 1997.

- a. **Solving an Equation** Write and solve an equation to find the year during which 2,500,000 16- and 17-year-olds were employed.

USING THE DISCRIMINANT Tell whether the equation has *two solutions*, *one solution*, or *no solution*.

3. $x^2 + x + 1 = 0$

5. $-2x^2 + 8x - 4 = 0$

7. $9v^2 - 6v + 1 = 0$

9. $25p^2 - 16p = 0$

11. $10 = x^2 - 5x$

13. $-3g^2 - 4g = \frac{4}{3}$

15. $3n^2 + 3 = 10n - 3n^2$

17. $w^2 - 7w + 29 = 4 - 7w$

19. **★ MULTIPLE CHOICE** How many solutions does $-x^2 + 4x = 8$ have?

Ⓐ None

Ⓑ One

Ⓒ Two

Ⓓ Three

ERROR ANALYSIS Describe and correct the error in finding the number of solutions of the equation.

21. $3x^2 - 7x - 4 = -9$

$$\begin{aligned} b^2 - 4ac &= (-7)^2 - 4(3)(-4) \\ &= 49 - (-48) \\ &= 97 \end{aligned}$$

The equation has two solutions.

FINDING THE NUMBER OF x-INTERCEPTS Find the number of x -intercepts of the graph of the function.

23. $y = 2x^2 - x - 1$

25. $y = 2x^2 - 5x + 5$

27. $y = 6x^2 + x + 2$

29. $y = \frac{1}{4}x^2 - 3x + 9$

REASONING Give a value of c for which the equation has (a) two solutions, (b) one solution, and (c) no solution.

31. $x^2 - 2x + c = 0$

USING THE DISCRIMINANT Tell whether the vertex of the graph of the function lies above, below, or on the x -axis. Explain your reasoning.

35. $y = 3x^2 - 6x + 3$