

Solving this equation, we obtain

$$60h + 202 = 412$$

$$60h = 210$$

$$h = 3\frac{1}{2}$$

Khoa was charged for $3\frac{1}{2}$ hours of labor.

Concept Quiz 2.1

For Problems 1–10, answer true or false.

- Equivalent equations have the same solution set.
- $x^2 = 9$ is a first-degree equation.
- The set of all solutions is called a solution set.
- If the solution set is the null set, then the equation has at least one solution.
- Solving an equation refers to obtaining any other equivalent equation.
- If 5 is a solution, then a true numerical statement is formed when 5 is substituted for the variable in the equation.
- Any number can be subtracted from both sides of an equation, and the result is an equivalent equation.
- Any number can divide both sides of an equation to obtain an equivalent equation.
- The equation $2x + 7 = 3y$ is a first-degree equation in one variable.
- The multiplication property of equality states that an equivalent equation is obtained whenever both sides of an equation are multiplied by a nonzero number.

Problem Set 2.1

For Problems 1–50, solve each equation. (Objective 1)

1. $3x + 4 = 16$

2. $4x + 2 = 22$

3. $5x + 1 = -14$

4. $7x + 4 = -31$

5. $-x - 6 = 8$

6. $8 - x = -2$

7. $4y - 3 = 21$

8. $6y - 7 = 41$

9. $3x - 4 = 15$

10. $5x + 1 = 12$

11. $-4 = 2x - 6$

12. $-14 = 3a - 2$

13. $-6y - 4 = 16$

14. $-8y - 2 = 18$

15. $4x - 1 = 2x + 7$

16. $9x - 3 = 6x + 18$

17. $5y + 2 = 2y - 11$

18. $9y + 3 = 4y - 10$

19. $3x + 4 = 5x - 2$

20. $2x - 1 = 6x + 15$

21. $-7a + 6 = -8a + 14$

22. $-6a - 4 = -7a + 11$

23. $5x + 3 - 2x = x - 15$

24. $4x - 2 - x = 5x + 10$

25. $6y + 18 + y = 2y + 3$

26. $5y + 14 + y = 3y - 7$

27. $4x - 3 + 2x = 8x - 3 - x$

28. $x - 4 - 4x = 6x + 9 - 8x$

29. $6n - 4 - 3n = 3n + 10 + 4n$

30. $2n - 1 - 3n = 5n - 7 - 3n$

31. $4(x - 3) = -20$

32. $3(x + 2) = -15$

33. $-3(x - 2) = 11$

34. $-5(x - 1) = 12$

35. $5(2x + 1) = 4(3x - 7)$

36. $3(2x - 1) = 2(4x + 7)$

37. $5x - 4(x - 6) = -11$

38. $3x - 5(2x + 1) = 13$

39. $-2(3x - 1) - 3 = -4$

40. $-6(x - 4) - 10 = -12$

41. $-2(3x + 5) = -3(4x + 3)$

42. $-(2x - 1) = -5(2x + 9)$

43. $3(x - 4) - 7(x + 2) = -2(x + 18)$

44. $4(x - 2) - 3(x - 1) = 2(x + 6)$

45. $-2(3n - 1) + 3(n + 5) = -4(n - 4)$

46. $-3(4n + 2) + 2(n - 6) = -2(n + 1)$

47. $3(2a - 1) - 2(5a + 1) = 4(3a + 4)$

48. $4(2a + 3) - 3(4a - 2) = 5(4a - 7)$

49. $-2(n - 4) - (3n - 1) = -2 + (2n - 1)$

50. $-(2n - 1) + 6(n + 3) = -4 - (7n - 11)$

For Problems 51–66, use an algebraic approach to solve each problem. (Objective 2)

51. If 15 is subtracted from three times a certain number, the result is 27. Find the number.

52. If one is subtracted from seven times a certain number, the result is the same as if 31 is added to three times the number. Find the number.

53. Find three consecutive integers whose sum is 42.

54. Find four consecutive integers whose sum is -118 .

55. Find three consecutive odd integers such that three times the second minus the third is 11 more than the first.

56. Find three consecutive even integers such that four times the first minus the third is six more than twice the second.

57. The difference of two numbers is 67. The larger number is three less than six times the smaller number. Find the numbers.

58. The sum of two numbers is 103. The larger number is one more than five times the smaller number. Find the numbers.

59. Angelo is paid double time for each hour he works over 40 hours in a week. Last week he worked 46 hours and earned \$572. What is his normal hourly rate?

60. Suppose that a plumbing repair bill, not including tax, was \$130. This included \$25 for parts and an amount for 2 hours of labor. Find the hourly rate that was charged for labor.

61. Suppose that Maria has 150 coins consisting of pennies, nickels, and dimes. The number of nickels she has is 10 less than twice the number of pennies; the number of dimes she has is 20 less than three times the number of pennies. How many coins of each kind does she have?

62. Hector has a collection of nickels, dimes, and quarters totaling 122 coins. The number of dimes he has is 3 more than four times the number of nickels, and the number of quarters he has is 19 less than the number of dimes. How many coins of each kind does he have?

63. The selling price of a ring is \$750. This represents \$150 less than three times the cost of the ring. Find the cost of the ring.

64. In a class of 62 students, the number of females is one less than twice the number of males. How many females and how many males are there in the class?

65. An apartment complex contains 230 apartments, each having one, two, or three bedrooms. The number of two-bedroom apartments is 10 more than three times the number of three-bedroom apartments. The number of one-bedroom apartments is twice the number of two-bedroom apartments. How many apartments of each kind are in the complex?

66. Barry sells bicycles on a salary-plus-commission basis. He receives a weekly salary of \$300 and a commission of \$15 for each bicycle that he sells. How many bicycles must he sell in a week to have a total weekly income of \$750?

Thoughts Into Words

67. Explain the difference between a numerical statement and an algebraic equation.

68. Are the equations $7 = 9x - 4$ and $9x - 4 = 7$ equivalent equations? Defend your answer.

69. Suppose that your friend shows you the following solution to an equation.

$$17 = 4 - 2x$$

$$17 + 2x = 4 - 2x + 2x$$

$$17 + 2x = 4$$

$$17 + 2x - 17 = 4 - 17$$

$$2x = -13$$

$$x = \frac{-13}{2}$$

Is this a correct solution? What suggestions would you have in terms of the method used to solve the equation?