Margin Exercise Answers

1. a. 15 **b.** −20 **c.** 5.9 **d.** $-\frac{11}{15}$ **2. a.** 8 **b.** −7 **c.** −2.3 **d.** $\frac{4}{9}$ **3. a.** −5 **b.** −3.6 **4. a.** −34 **b.** 7

8.2 Exercises

Concept Check

Fill-in-the-Blank. Complete each sentence using information found in this section.

1. If there is no sign in front of a number, it is understood to be a _____ number.
2. The sum of two positive real numbers is always _____.
3. The sum of two negative real numbers is always _____.
4. To find the sum of numbers with unlike signs, subtract their _____ _____.
5. A statement that two expressions are equal is called a/an _____.

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

6. The sum of a positive number and a negative number is always positive.
7. When adding numbers with unlike signs, the results uses the sign of the number with the larger absolute value.
8. The sum of two positive numbers can equal zero.

Practice

Add. Reduce any fractions to lowest terms.

1. $4+9$
2. $8+(-3)$
3. $(-9)+5$
4. $(-7)+(-3)$
5. $(-9)+9$
6. $2+(-8)$
7. $11+(-6)$
8. $(-12)+3$
9. $-18+5$
10. $26+(-26)$
11. $-5+(-3)$
12. $11+(-2)$
13. $(-2)+(-8)$
14. $10+(-3)$
15. $17+(-17)$
16. $(-7)+20$
17. $21+(-4)$
18. $2.1+(-4.6)$
19. $-1.5+(-3.1)$
20. $(-15)+(-3)$

21. $(-12)+(-17)$

22. $24+(-16)$

23. $-4+(-5)$

24. $-4.3+(-5.8)$

25. $-6.9+(-8.5)$

26. $(-6)+(-8)$

27. $9+(-12)$

28. $-12+9$

29. $(-33)+(-21)$

30. $(-21)+18$

31. $9.7+(-12.2)$

32. $-19.6+4.1$

33. $\frac{3}{14}+\frac{3}{14}$

34. $\frac{1}{10}+\frac{3}{10}$

35. $\frac{3}{4}+\left(-\frac{1}{8}\right)$

36. $\frac{5}{17}+\left(-\frac{15}{34}\right)$

37. $-\frac{5}{2}+\frac{3}{4}$

38. $-\frac{1}{6}+\frac{7}{15}$

39. $-3+4+(-8)$

40. $(-9)+(-6)+5$

41. $3.2+(-1.2)+(-2.5)$

42. $-5.3+1.9+(-0.7)$

43. $102+(-21)+(-5)$

44. $130+(-45)+(-32)$

45. $-210+(-200)+100$

46. $-18+(-15)+(-30)$

47. $35+2+(-5)+(-5)$

48. $-56+(-3)+(-1)+3$

49. $3.7+(-0.6)+1.4+(-2.2)$

50. $-7.5+(-2.4)+3.5+6.1$

Add. Be sure to find the absolute values first.

51. $13+|-5|$

52. $|-2|+(-5)$

53. $|-10|+|-4|$

54. $|-7|+(+7)$

55. $|-18|+|+17|$

56. $|-14|+|-6|$

Add using a calculator.

57. $47+(-29)+66$

58. $56+(-41)+(-28)$

59. $2932+4751+(-3876)$

60. $(-8154)+2147+(-136)$

61. $(-16{,}945)+(-27{,}302)+(-53{,}467)$

62. $(-12{,}299)+15{,}631+(-47{,}558)$

Applications

Solve.

63. The table shows the reported profit or loss per quarter as reported by a business. Did the business have a total positive or negative profit for the year?

Quarter	Profit/Loss
1	$15,000
2	–$8000
3	–$2000
4	$1000

64. For 2024, a business reports a profit of $45,000 during the first quarter, a loss of $8000 during the second quarter, a loss of $2000 during the third quarter, and a profit of $15,000 during the fourth quarter.

a. Write an addition expression to represent the total profit made by the company in 2024. Do not simplify.

b. Simplify the expression from part a.

65. A climatologist takes weekly measurements of the height of a glacier near the North Pole. She keeps track of how much the glacier's height either increased or decreased during the week. Her results are presented in the table.

Week	Increase	Decrease
1	0.25 cm	
2		0.3 cm
3		0.1 cm
4	0.17 cm	

a. Which measurements in the table would have a negative value?

b. Calculate the total change in height of the glacier over the four weeks. (**Hint:** Find the sum.)

c. Did the total height of the glacier increase or decrease by the end of the four weeks?

66. A passenger boards an elevator five floors below the ground floor. In this building, the ground floor is floor 0 and the floor above the ground floor is floor 1. The elevator goes up 8 floors before the passenger exits the elevator. At which floor did the passenger exit the elevator?

67. A submarine dives to a depth of 250 feet below the surface. It rises 75 feet before diving an additional 100 feet. What is the final depth of the submarine?

68. The temperature at 2 a.m. was –17 °C. By 2 p.m., the temperature increased a total of 15 °C. What was the temperature at 2 p.m.?

69. The tallest hill of a roller coaster is 282 feet above the ground. The hill descends 290 feet before leveling out. What is the lowest point of this hill of the roller coaster?

70. From the noon weather report to the evening weather report, the temperature changed from 72 °F to 55 °F. This situation can be represented by the equation $72 + t = 55$, where t represents the change in temperature. Determine which of the following values satisfies the equation: –13, 13, –17, 17.

71. At the end of the first inning of a baseball game, the home team had a score of 3 points. At the end of the ninth inning, the home team had a score of 11 runs. This situation can be represented by the equation $3 + x = 11$, where x represents the change in score. Determine which of the following values satisfies the equation: -8, 8, -4, 4.

72. Charlotte is a zoologist and part of her job is to keep track of the growth rate of a recently born koala. She writes in her report that the koala weighs 5.6 ounces more than it did when it was born a month ago, and the current weight is 28.4 ounces. This can be translated into a mathematical equation as $w + 5.6 = 28.4$, where w is the weight in ounces of the koala at birth. Determine the birth weight of the koala by substituting each of the following values into the equation to find the solution: 22.7 ounces, 23.2 ounces, 22.8 ounces, 23.8 ounces.

73. Part of Noam's job as an accountant is to keep track of the amount of money in the reserve fund. Last week, the fund started with \$1253.75 and only one transaction was made. This week, the fund started with \$1155.89. This change in value can be written in equation form as $\$1253.75 + t = \$1155.89$, where t is the amount of the transaction. Determine the amount of the transaction by substituting each of the following values into the equation to find the solution: $-\$150.14$, $-\$97.86$, $-\$89.86$, $-\$97.14$.

74. Trevor is installing a hardwood floor in a customer's living room. The length of the room is $17\frac{3}{8}$ feet. Since the flooring comes in 12-foot pieces, Trevor needs to determine the length he must cut off of one of the boards to make it fit. The amount he needs to trim off of one of the boards can be represented by the equation $12 + (12 - r) = 17\frac{3}{8}$, where r is the amount to be removed from one of the boards. Determine the amount that needs to be trimmed off of one of the boards by substituting each of the following values into the equation to find the solution: $5\frac{5}{8}$ feet, $5\frac{3}{8}$ feet, $6\frac{5}{8}$ feet, $6\frac{3}{8}$ feet.

Writing & Thinking

75. Describe, in your own words, how the sum of the absolute values of two numbers might be 0. (Is this even possible?)

76. Describe in your own words the conditions under which the sum of two integers will be 0.

Choose the response that correctly completes each statement. In each problem, give two examples that illustrate your reasoning.

77. If x and y are real numbers, then $x + y$ is (never, sometimes, always) equal to 0.

78. If x and y are real numbers, then $x + y$ is (never, sometimes, always) negative.

79. If x and y are real numbers, then $x + y$ is (never, sometimes, always) positive.

80. If x is a positive real number and y is a negative real number, then $x + y$ is (never, sometimes, always) equal to 0.

81. If x and y are positive real numbers, then $x + y$ is (never, sometimes, always) equal to 0.

82. If x and y are both negative real numbers, then $x + y$ is (never, sometimes, always) equal to 0.

83. If x is a negative real number, then $-x$ is (never, sometimes, always) negative.

84. If x is a positive real number, then $-x$ is (never, sometimes, always) negative.