Page 77 answers

2.2 EXERCISES

HOMEWORK KEY

○ = WORKED-OUT SOLUTIONS on p. WS1 for Exs. 13, 35, and 55

★ = STANDARDIZED TEST PRACTICE Exs. 2, 50, 56, 57, and 58

SKILL PRACTICE

A

1. **VOCABULARY** What number is called the additive identity? 0

2. ★ **WRITING** Without actually adding, how can you tell if the sum of two numbers will be zero? If they are opposites, their sum will be zero.

EXAMPLE 1 on p. 74 for Exs. 3–11

USING A NUMBER LINE Use a number line to find the sum.

3. $-11 + 3$ -8
4. $-1 + 6$ 5
5. $13 + (-7)$ 6
6. $5 + (-10)$ -5
7. $-9 + (-4)$ -13
8. $-8 + (-2)$ -10
9. $-14 + 8$ -6
10. $6 + (-12)$ -6
11. $-11 + (-9)$ -20

EXAMPLE 2 on p. 75 for Exs. 12–25

FINDING SUMS Find the sum.

12. $-2.4 + 3.9$ 1.5
13. $-8.7 + 4.2$ -4.5
14. $4.3 + (-10.2)$ -5.9
15. $9.1 + (-2.5)$ 6.6
16. $-6.5 + (-7.1)$ -13.6
17. $-11.4 + (-3.8)$ -15.2
18. $4\frac{1}{5} + \left(-9\frac{1}{2}\right)$ $-5\frac{3}{10}$
19. $8\frac{2}{3} + \left(-1\frac{3}{5}\right)$ $7\frac{1}{15}$
20. $12\frac{3}{4} + 6\frac{9}{10}$ $-5\frac{17}{20}$
21. $-\frac{4}{9} + 1\frac{4}{5}$ $1\frac{16}{45}$
22. $-3\frac{3}{7} + \left(-14\frac{3}{4}\right)$ $-18\frac{5}{28}$
23. $-7\frac{1}{12} + \left(-13\frac{7}{8}\right)$ $-20\frac{23}{24}$

ERROR ANALYSIS *Describe* and correct the error in finding the sum.

24. $-13 + (-15) = 28$ ✗

The answer should be negative, $-13 + (-15) = -28$.

25. $17 + (-31) = -48$ ✗

The numbers have different signs, so their absolute values should have been subtracted, $17 + (-31) = -14$.

EXAMPLE 3 on p. 76 for Exs. 26–31

IDENTIFYING PROPERTIES Identify the property being illustrated.

26. $-3 + 3 = 0$ Inverse property of addition
27. $(-6 + 1) + 7 = -6 + (1 + 7)$ Associate property of addition
28. $9 + (-1) = -1 + 9$ Commutative property of addition
29. $-8 + 0 = -8$ Identity property of addition
30. $(x + 2) + 3 = x + (2 + 3)$ Associative property of addition
31. $y + (-4) = -4 + y$ Commutative property of addition

EXAMPLE 4 on p. 76 for Exs. 32–37

FINDING SUMS Find the sum.

32. $13 + 5 + (7)$ -15
33. $18 + (12) + (19)$ -49
34. $0.47 + (-1.8) + (-3.8)$ -5.13
35. $-2.6 + (-3.4) + 7.6$ 1.6
36. $-3\frac{1}{2} + \left(-7\frac{2}{5}\right) + \left(-9\frac{3}{10}\right)$ $-20\frac{1}{5}$
37. $8\frac{2}{3} + \left(-6\frac{3}{5}\right) + 3\frac{1}{4}$ $5\frac{19}{60}$

B

EVALUATING EXPRESSIONS Evaluate the expression for the given value of x.

38. $3 + x + (-7); x = 6$ 2
39. $x + (-5) + 5; x = -3$ -3
40. $9.6 + (-x) + 2.3; x = -8.5$ 20.4
41. $-1.7 + (-5.4) + (-x); x = 2.4$ -9.5
42. $1\frac{1}{4} + |x| + \left(-3\frac{1}{2}\right); x = -8\frac{2}{5}$ $6\frac{3}{20}$
43. $|x| + \left(-3\frac{1}{4}\right) + \left(7\frac{3}{10}\right); x = -3\frac{1}{3}$ $7\frac{23}{60}$

Differentiated Instruction

FINDING SOLUTIONS **Solve the equation using mental math.**

44. $x + (-9) + 9 = 8$ **8**

45. $(-8) + x + (-2) = -10$ **0**

46. $x + (-2.8) + 9.2 = 0$ **−6.4**

47. $-8.7 + x + 1.3 = 0$ **7.4**

TRANSLATING PHRASES **In Exercises 48 and 49, translate the verbal phrase into an addition expression. Then find the sum.**

48. The sum of the absolute value of −4 and the additive identity $|-4| + 0$; 4

49. The sum of the opposite of −18 and its additive inverse $-(-18) + (-18)$; 0

50. ★ **MULTIPLE CHOICE** If $a + b$ is negative, which statement must be true? **D**

Ⓐ $a < 0, b < 0$ Ⓑ $a < 0$ Ⓒ $a < 0, b > 0$ Ⓓ $a < -b$

51. **CHALLENGE** Consider the expression $|x| + (-x)$. Write a simplified expression for the sum if x is positive. Then write a simplified expression for the sum if x is negative. Give examples to support your answers. **See margin.**

52. **CHALLENGE** Evaluate $-50 + (-49) + (-48) + \cdots + 48 + 49 + 50$. *Explain* how you can use the properties of addition to obtain the sum.
0; use the commutative property of addition to add each negative number and its opposite. By the additive inverse property, it will equal 0.

PROBLEM SOLVING

EXAMPLE 1 Ⓐ p. 74 Ex. 53

53. **WEATHER** The temperature in your city at 6 A.M. was −8°F and increased by 15°F by noon. What was the temperature at noon? **7°F**

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EXAMPLE 2 p. 75 Exs. 54–55

54. **PARKING GARAGES** The bottom level of a parking garage has an elevation of −45 feet. The top level of the garage is 100 feet higher. What is the elevation of the top level? **55 ft**

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55. **MULTI-STEP PROBLEM** In optometry, the strength of an eyeglass lens is measured in diopters. Two lenses can be combined to create a new lens, and the sum of their strengths is the strength of the new lens.

a. A lens of −4.75 diopters is combined with a lens of 6.25 diopters to form a new lens. What is the strength of the new lens? **1.5 diopters**

b. A lens of −2.5 diopters is combined with a lens of −1.25 diopters to form a new lens. What is the strength of the new lens? **−3.75 diopters**

c. The greater the absolute value of the strength of a lens, the stronger the lens. Which new lens is stronger, the one in part (a) or in part (b)? **part (b)**

EXAMPLE 4 p. 76 Exs. 56–57

56. ★ **MULTIPLE CHOICE** The table shows the profits for a company from 1999 to 2004. Which three-year period had the greatest total profit? **C**

Year	1999	2000	2001	2002	2003	2004
Profit (millions of dollars)	−13.76	54.91	38.54	−21.33	123.90	−14.82

Ⓐ 1999–2001 Ⓑ 2000–2002 Ⓒ 2001–2003 Ⓓ 2002–2004

○ = WORKED-OUT SOLUTIONS on p. WS1

★ = STANDARDIZED TEST PRACTICE

2.4 EXERCISES

HOMEWORK KEY

- ◯ = **WORKED-OUT SOLUTIONS** on p. WS1 for Exs. 11, 31, and 51
- ★ = **STANDARDIZED TEST PRACTICE** Exs. 2, 48, 52, 53, and 55
- = **MULTIPLE REPRESENTATIONS** Ex. 54

SKILL PRACTICE

A

1. **VOCABULARY** What number is called the multiplicative identity? 1

2. ★ **WRITING** *Describe* the difference between the identity property of multiplication and the multiplicative property of −1. See margin.

EXAMPLE 1 on p. 88 for Exs. 3–18

FINDING PRODUCTS **Find the product.**

3. $-4(7)$ −28
4. $11(-2)$ −22
5. $-9(-10)$ 90
6. $-8(-11)$ 88
7. $5(-7.2)$ −36
8. $(-2.5)(-1.3)$ 3.25
9. $-42\left(-\frac{1}{6}\right)$ 7
10. $-\frac{1}{2}(-32)$ 16
11. $-1.9(3.3)(7)$ −43.89
12. $0.5(-20)(-3)$ 30
13. $-\frac{5}{6}(-12)(-4)$ −40
14. $-\frac{3}{4}(2)(-6)$ 9
15. $-8(-4)(-2.5)$ −80
16. $-1.6(-2)(-10)$ −32
17. $18\left(-\frac{2}{3}\right)\left(-\frac{1}{5}\right)$ $2\frac{2}{5}$
18. $-\frac{3}{4}\left(-\frac{1}{3}\right)\left(-\frac{8}{9}\right)$ $-\frac{2}{9}$

EXAMPLE 2 on p. 89 for Exs. 19–27

IDENTIFYING PROPERTIES **Identify the property illustrated.** 19–27. See margin.

19. $-\frac{2}{5} \cdot 0 = 0$
20. $0.3 \cdot (-3) = -3 \cdot 0.3$
21. $-143 \cdot 1 = -143$
22. $-1 \cdot (-6) = 6$
23. $(-2 \cdot 5) \cdot 4 = -2 \cdot (5 \cdot 4)$
24. $0 \cdot (-76.3) = 0$
25. $1 \cdot (ab) = ab$
26. $(3x)y = 3(xy)$
27. $s \cdot (-1) = -s$

EXAMPLE 3 on p. 90 for Exs. 28–36

USING PROPERTIES **Find the product. *Justify* your steps.** 28–36. See margin.

28. $y(-2)(-8)$
29. $-18(-x)$
30. $\frac{3}{5}(-5q)$
31. $-2(-6)(-7z)$
32. $-5(-4)(-2.1)(-z)$
33. $-\frac{1}{5}(-10)(4)(-5c)$
34. $-5t(-t)$
35. $-6r(-2.8r)$
36. $\frac{1}{3}\left(-\frac{9}{10}\right)(-m)(-m)$

B

EVALUATING EXPRESSIONS **Evaluate the expression when $x = -2$ and $y = 3.6$.**

37. $2x + y$ −0.4
38. $-x - 3y$ −8.8
39. $xy - 5.4$ −12.6
40. $|y| - 4x$ 11.6
41. $1.5x - |-y|$ −6.6
42. $x^2 - y^2$ −8.96

43. −1(7) = −7, not 7; $-1(7)(-3)(-2x) = -7(-3)(-2x) = 21(-2x) = [21 \cdot (-2)]x = -42x$

44. $(-8)(-5) = 40$, not -40; $(-8)(-5)(z)(z) = 40(z \cdot z) = 40z^2$

ERROR ANALYSIS ***Describe*** **and correct the error in finding the product.**

43.
$$-1(7)(-3)(-2x) = 7(-3)(-2x)$$
$$= -21(-2x)$$
$$= [-21 \cdot (-2)]x$$
$$= 42x$$

44.
$$(-5z)(-8)(z) = (-8)(-5z)(z)$$
$$= (-8)(-5)(z)(z)$$
$$= -40(z \cdot z)$$
$$= -40z^2$$