Integers and Rational Numbers

Solutions Key

ARE YOU READY?

1. graph

2. order

3. equation

4. whole number

5. solve

6. $7 + 9 - 5 \cdot 2$
$16 - 10$
6

7. $12 \cdot 3 - 4 \cdot 5$
$36 - 4 \cdot 5$
$36 - 20$
16

8. $115 - 15 \cdot 3 + 9(8 - 2)$
$115 - 15 \cdot 3 + 9(6)$
$115 - 45 + 9(6)$
$115 - 45 + 54$
$70 + 54$
124

9. $20 \cdot 5 \cdot 2(7 + 1) \div 4$
$20 \cdot 5 \cdot 2(8) \div 4$
$100 \cdot 2(8) \div 4$
$200(8) \div 4$
$1{,}600 \div 4$
400

10. $300 + 6(5 - 3) - 11$
$300 + 6(2) - 11$
$300 + 12 - 11$
$312 - 11$
301

11. $14 - 13 + 9 \cdot 2$
$14 - 13 + 18$
$1 + 18$
19

12. Add to write in standard from: $40 + 1 + 0.2 + 0.04 = 41.24$.
Read the decimal out loud to write in word from: forty-one and twenty-four hundredths.

13. Add to write in standard from: $5{,}000 + 300 + 10 + 4 + 0.8 = 5{,}314.8$.
Read the decimal out loud to write in word from: five thousand, three hundred fourteen and eight tenths.

14. Add to write in standard from: $800 + 50 + 2 + 0.03 + 0.005 = 852.035$.
Read the decimal out loud to write in word from: eight hundred fifty-two and thirty-five thousandths.

15. Add to write in standard from: $100{,}000 + 30{,}000 + 600 + 3 + 0.05 = 130{,}603.05$.
Read the decimal out loud to write in word from: one hundred thirty thousand, six hundred three and five hundredths.

16. $n + 3 = 10$
$n + 3 - 3 = 10 - 3$
$n = 7$

17. $x - 4 = 16$
$x - 4 + 4 = 16 + 4$
$x = 20$

18. $9p = 63$
$\frac{9p}{9} = \frac{63}{9}$
$p = 7$

19. $\frac{t}{5} = 80$
$\frac{t}{5} \cdot 5 = 80 \cdot 5$
$t = 400$

20. $x - 3 = 14$
$x - 3 + 3 = 14 + 3$
$x = 17$

21. $\frac{q}{3} = 21$
$\frac{q}{3} \cdot 3 = 21 \cdot 3$
$q = 63$

26. $9 + r = 91$
$9 + r - 9 = 91 - 9$
$r = 82$

23. $15p = 45$
$\frac{15p}{15} = \frac{45}{15}$
$p = 3$

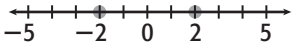
LESSON 1

Think and Discuss

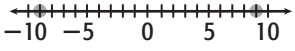
1. $-4{,}500$

2. The greatest negative integer is -1. The least nonnegative integer is 0. The absolute value of -1 is 1. The absolute value of 0 is 0. The absolute value of -1 is greater than the absolute value of 0.

Exercises

1. 

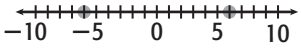
The opposite of 2 is -2.

2. 

The opposite of -9 is 9.

3. 

The opposite of -1 is 1.

4. 

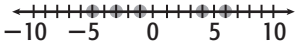
The opposite of 6 is -6.

5. $5 > -5$

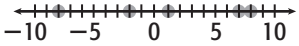
6. $-9 > -18$

7. $-21 < -17$

8. $-12 < 12$

9. 

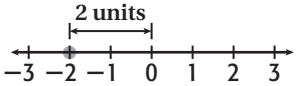
$-5, -3, -1, 4, 6$

10. 

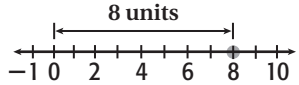
$-8, -2, 1, 7, 8$

11. 

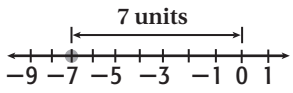
$-6, -4, 0, 1, 3$

12. 

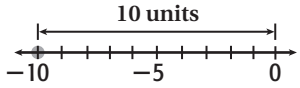
-2 is 2 units from 0, so $|-2| = 2$.

13. 

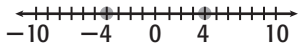
8 is 8 units from 0, so $|8| = 8$.

14. 

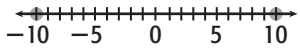
-7 is 7 units from 0, so $|-7| = 7$.

15. 

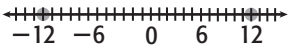
-10 is 10 units from 0, so $|-10| = 10$.

16. 

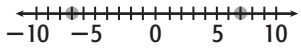
The opposite of -4 is 4.

17. 

The opposite of 10 is -10.

18. 

The opposite of -12 is 12.

19. 

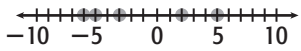
The opposite of 7 is -7.

20. $-14 < -7$

21. $9 > -9$

22. $-12 < 12$

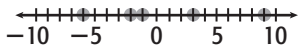
23. $-31 < -27$

24. 

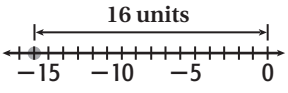
$-6, -5, -3, 2, 5$

25. 

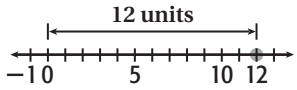
$-9, -7, -5, -2, 0$

26. 

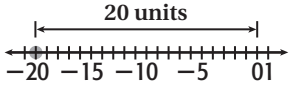
$-6, -2, -1, 3, 9$

27. 

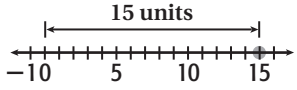
-16 is 16 units from 0, so $|-16| = 16$.

28. 

12 is -12 units from 0, so $|12| = 12$.

29. 

-20 is 20 units from 0, so $|-20| = 20$.

30. 

15 is 15 units from 0, so $|15| = 15$.

31. $-25 < 25$

32. $18 > -55$

33. $|-21| = 21$

34. $-9 > -27$

35. $34 = |34|$

36. $64 < |-75|$

37. $|-3| = |3|$

38. $-100 < -82$

39. **Aug, Jul, Sep, May, Jun, Apr, Mar, Oct**

40. $|32| = 32$
The opposite of 32 is -32.

41. $|-29| = 29$
The opposite of 29 is -29.

42. $-2{,}000{,}000$; $5{,}000{,}000$

43. Possible answer: $|-10| > |9|$
$10 > 9$

44. **a.** 30° south
b. They are the same.

45. decreased by about 9%

46. increased by about 27%

47. -12 °F < -3 °F, so it was getting colder outside.

48. Possible answer: Think about their placement on the number line. The integer to the right is the greater integer.

49. $|11| = 11$ and $|-11|$, so the value of x can be 11 or -11.

50. C. $-7, -6, -5, 2, 3$

51. G; March

LESSON 2

Think and Discuss

1. $-7 + 2$ has a negative sum, -5, while $7 + (-2)$ has a positive sum, 5; therefore, the two expressions are not the same.

2. Possible answer: $3 + (-5)$ and $-5 + 3$ give the same sum, -2.

Exercises

1. $9 + 3$
Start at 0. Move right 9 spaces. Then move right 3 more spaces.
$9 + 3 = 12$

2. $-4 + (-2)$
Start at 0. Move left 4 spaces. Then move left 2 more spaces.
$-4 + (-2) = -6$

3. $7 + (-9)$
Start at 0. Move right 7 spaces. Then move left 9 spaces.
$7 + (-9) = -2$

4. $-3 + 6$
Start at 0. Move left 3 spaces. Then move right 6 spaces.
$-3 + 6 = 3$

5. $7 + 8$
The signs are the same.
Find the sum of the absolute values.
Think: $7 + 8 = 15$
Use the sign of the two integers (positive).
15

6. $-1 + (-12)$
The signs are the same.
Find the sum of the absolute values.
Think $1 + 12 = 13$

Use the sign of the two integers (negative).
-13

7. $-25 + 10$
The signs are different. Find the difference of the absolute values.
Think: $25 - 10 = 15$
Use the sign of the integer with the greater absolute value (negative).
-15

8. $31 + (-20)$
The signs are different. Find the difference of the absolute values.
Think: $31 - 20 = 11$
Use the sign of the integer with the greater absolute value (positive).
11

9. Evaluate $a + b$ for $a = 5$, $b = -17$.
$a + b$
$5 + (-17)$
The signs are different. Find the difference of the absolute values.
Think: $17 - 5 = 12$
Use the sign of the integer with the greater absolute value (negative).
-12

10. Evaluate $a + b$ for $a = 8$, $b = -8$.
$a + b$
$8 + (-8)$
The signs are different.
Find the difference of the absolute values.
Think $8 - 8 = 0$
0

11. Evaluate $a + b$ for $a = -4$, $b = -16$.
$a + b$
$-4 + (-16)$
The signs are the same.
Find the sum of the absolute values.
Think: $4 + 16 = 20$
Use the sign of the two integers (negative).
-20

12. $8 + (-13) = -5$
Find the difference of the absolute values.
$13 - 8 = 5$
Use the sign of the integer with the greater absolute value (negative).
-5 yards is the team's total yardage.

13. $-16 + 7$
Start at 0. Move left 16 spaces. Then move right 7 spaces.
$-16 + 7 = -9$

14. $-5 + (-1)$
Start at 0. Move left 5 spaces. Then move left 1 more space.
$-5 + (-1) = -6$

15. $4 + 9$
Start at 0. Move right 4 spaces. Then move right 9 more spaces.
$4 + 9 = 13$

16. $-7 + 8$
Start at 0. Move left 7 spaces. Then move right 8 spaces.
$-7 + 8 = 1$

17. $10 + (-3)$
Start at 0. Move right 10 spaces. Then move left 3 spaces.
$10 + (-3) = 7$

18. $-20 + 2$
Start at 0. Move left 20 spaces. Then move right 2 spaces.
$-20 + 2 = -18$

19. $-12 + (-5)$
Start at 0. Move left 12 spaces. Then move left 5 more spaces.
$-12 + (-5) = -17$

20. $-9 + 6$
Start at 0. Move left 9 spaces. Then move right 6 spaces.
$-9 + 6 = -3$

21. $-13 + (-6)$
The signs are the same.
Find the sum of the absolute values.
Think: $13 + 6 = 19$
Use the sign of the two integers (negative).
-19

22. $14 + 25$
The signs are the same.
Find the sum of the absolute values.
Think: $14 + 25 = 39$
Use the sign of the two integers (positive).
39

23. $-22 + 6$
The signs are different.
Find the difference of the absolute values.
Think: $22 - 6 = 16$
Use the sign of the integer with the greater absolute value (negative).
-16

24. $35 + (-50)$
The signs are different.
Find the difference of the absolute values.
Think: $50 - 35 = 15$
Use the sign of the integer with the greater absolute value (negative).
-15

25. $-81 + (-7)$
The signs are the same.
Find the sum of the absolute values.
Think: $81 + 7 = 88$
Use the sign of the two integers (negative).
-88

26. $28 + (-3)$
The signs are different.
Find the difference of the absolute values.
Think: $28 - 3 = 25$
Use the sign of the integer with the greater absolute value (positive).
25

27. $-70 + 15$
The signs are different.
Find the difference of the absolute values.
Think: $70 - 15 = 55$
Use the sign of the integer with the greater absolute value (negative).
-55

28. $-18 + (-62)$
The signs are the same.
Find the sum of the absolute values.
Think: $18 + 62 = 80$
Use the sign of the two integers (negative).
-80

29. Evaluate $c + d$ for $c = 6$, $d = -20$
$c + d$
$6 + (-20)$
The signs are different.
Find the difference of the absolute values.
Think: $20 - 6 = 14$
Use the sign of the integer with the greater absolute value (negative).
-14

30. Evaluate $c + d$ for $c = -8$, $d = -21$
$c + d$
$-8 + (-21)$
The signs are the same.
Find the sum of the absolute values.
Think: $8 + 21 = 29$
Use the sign of the two integers (negative).
-29

31. Evaluate $c + d$ for $c = -45$, $d = 32$
$c + d$
$-45 + 32$
The signs are different.
Find the difference of the absolute values.
Think: $45 - 32 = 13$
Use the sign of the integer with the greater absolute value (negative).
-13

32. $-3 + 17$
Find the difference of the absolute values.
$17 - 3 = 14$
Use the sign of the integer with the greater absolute value (positive).
14 °F was the starting temperature.

33. $-8 + (-5)$
The signs are the same. Find the sum of the absolute values and take the sign of the integers.
$-8 + (-5) = -13$

34. $14 + (-7)$
The signs are different. Find the difference of the absolute values and take the sign of the integer with the greater absolute value.
$14 + (-7) = 7$

35. $-41 + 15$
The signs are different. Find the difference of the absolute values and take the sign of the integer with the greater absolute value.
$-41 + 15 = -26$

36. $-22 + (-18) + 22$
$-40 + 22$
-18

37. $27 + (-29) + 16$
$-2 + 16$
14

38. $-30 + 71 + (-70)$
$41 + (-70)$
-29

39. $-23 + 18 \blacksquare -41$
$-5 > -41$

40. $59 + (-59) \blacksquare 0$
$0 = 0$

41. $31 + (-20) \blacksquare 9$
$11 > 9$

42. $-24 + (-24) \blacksquare 48$
$-48 < 48$

43. $25 + (-70) \blacksquare -95$
$-45 > -95$

44. $16 + (-40) \blacksquare -24$
$-24 = -24$

45. $45 + 18 + 27 + (-21) + (-93)$
$90 + (-21) + (-93)$
$69 + (-93)$
-24
Cody's account is reduced by $24.

46. Evaluate $7 + y$ for $w = -12$, $x = 10$, and $y = -7$.
$7 + y$
$7 + (-7)$
0

47. Evaluate $-4 + w$ for $w = -12$, $x = 10$, and $y = -7$.
$-4 + w$
$-4 + (-12)$
-16

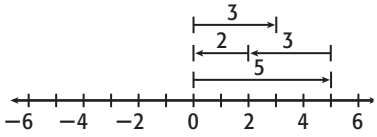
48. Evaluate $w + y$ for $w = -12$, $x = 10$, and $y = -7$.
$w + y$
$-12 + (-7)$
-19

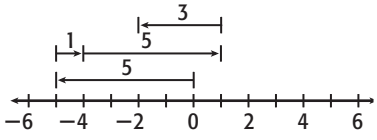
49. Evaluate $x + y$ for $w = -12$, $x = 10$, and $y = -7$.
$x + y$
$10 + (-7)$
3

50. Evaluate $w + x$ for w $= -12$, $x = 10$, and $y = -7$.
$w + x$
$-12 + 10$
-2

51. $3{,}100 + 730 + (-380) + 60 + (-140) + 780 =$ 4,150 ft.
The elevation of West Peak is 4,150 ft.

52. Hector: $5 + (-3) + (-2) + 3 = 3$
Luis: $-5 + 1 + 5 + (-3) = -2$





Hector; Hector has 3 points, while Luis has -2 points, so Hector wins by 5 points.

53. What was the temperature at 9 A.M.?

54. Possible answer: First add integers with like signs. The sign of the sum is the sign of the integers. Then add unlike integers by finding the difference of their absolute values. Use the sign of the integer with the greater absolute value.

55. $-225 + 15 + 125 + (-75) + (-375) = -535$
The business had an overall loss of $535 million.

56. C; $-4 + 3$ **57.** F; $-4 + 8$

LESSON 3

Think and Discuss

1. The result will be greater because subtracting a negative integer is equivalent to adding a positive integer.

2. Subtraction is not commutative. You cannot reverse the order of integers when subtracting. However, when subtraction is rewritten as adding the opposite integer, the order of the addends can be reversed.

Exercises

1. $4 - 7$
Start at 0. Move right 4 spaces. To subtract 7, move to the left.
$4 - 7 = -3$

2. $-6 - 5$
Start at 0. Move left 6 spaces. To subtract 5, move to the left.
$-6 - 5 = -11$

3. $2 - (-4)$
Start at 0. Move right 2 spaces. To subtract -4, move to the right.
$2 - (-4) = 6$

4. $-8 - (-2)$
Start at 0. Move left 8 spaces. To subtract -2, move to the right.
$-8 - (-2) = -6$

5. $6 - 10$
Add the opposite of 10.
$6 + (-10)$
-4

6. $-3 - (-8)$
Add the opposite of (-8).
$-3 + 8$
5

7. $-1 - 9$
Add the opposite of 9.
$-1 + (-9)$
-10

8. $-12 - (-2)$
Add the opposite of (-2).
$-12 + 2$
-10

9. Evaluate $a - b$ for $a = 5$, $b = -2$.
$a - b$
Substitute for a and b. Add the opposite of -2.
$5 - (-2) = 5 + 2 = 7$

10. Evaluate $a - b$ for $a = -8$, $b = 6$.
$a - b$
Substitute for a and b. Add the opposite of 6.
$-8 - 6 = -8 + (-6) = -14$

11. Evaluate $a - b$ for $a = 4$, $b = 18$.
$a - b$
Substitute for a and b. Add the opposite of 18.
$4 - 18 = 4 + (-18) = -14$

12. $15 - (-32)$
Add the opposite of -32.
$15 + 32 = 47$
The temperature increased 47 °F.

13. $7 - 12$
Start at 0. Move right 7 spaces. To subtract 12, move to the left.
$7 - 12 = -5$

14. $-5 - (-9)$
Start at 0. Move left 5 spaces. To subtract -9, move to the right.
$-5 - (-9) = 4$

15. $2 - (-6)$
Start at 0. Move right 2 spaces. To subtract -6, move to the right.
$2 - (-6) = 8$

16. $7 - (-8)$
Start at 0. Move right 7 spaces. To subtract -8, move to the right.
$7 - (-8) = 15$

17. $9 - (-3)$
Start at 0. Move right 9 spaces. To subtract -3, move to the right.
$9 - (-3) = 12$

18. $-4 - 10$
Start at 0. Move left 4 spaces. To subtract 10, move to the left.
$-4 - 10 = -14$

19. $8 - (-8)$
Start at 0. Move right 8 spaces. To subtract -8, move to the right.
$8 - (-8) = 16$

20. $-3 - (-3)$
Start at 0. Move left 3 spaces. To subtract -3, move to the right.
$-3 - (-3) = 0$

21. $-22 - (-5)$
Add the opposite of -5.
$-22 + 5$
-17

22. $-4 - 21$
Add the opposite of 21.
$-4 + (-21)$
-25

23. $27 - 19$
Add the opposite of 19.
$27 + (-19)$
8

24. $-10 - (-7)$
Add the opposite of -7.
$-10 + 7$
-3

25. $30 - (-20)$
Add the opposite of -20.
$30 + 20$
50

26. $-15 - 15$
Add the opposite of 15.
$-15 + (-15)$
-30

27. $12 - (-6)$
Add the opposite of -6.
$12 + 6$
18

28. $-31 - 15$
Add the opposite of 15.
$-31 + (-15)$
-46

29. Evaluate $a - b$ for $a = 9$, $b = -7$.
$a - b$
Substitute for a and b. Add the opposite of -7.
$9 - (-7) = 9 + 7 = 16$

30. Evaluate $a - b$ for $a = -11$, $b = 2$.
$a - b$
Substitute for a and b. Add the opposite of 2.
$-11 - 2 = -11 + (-2) = -13$

31. Evaluate $a - b$ for $a = -2$, $b = 3$.
$a - b$
Substitute for a and b. Add the opposite of 3.
$-2 - 3 = -2 + (-3) = -5$

32. Evaluate $a - b$ for $a = 8$, $b = 19$.
$a - b$
Substitute for a and b. Add the opposite of 19.
$8 - 19 = 8 + (-19) = -11$

33. Evaluate $a - b$ for $a = -10$, $b = 10$.
$a - b$
Substitute for a and b. Add the opposite of 10.
$-10 - 10 = -10 + (-10) = -20$

34. Evaluate $a - b$ for $a = -4$, $b = -15$.
$a - b$
Substitute for a and b. Add the opposite of -15.
$-4 - (-15) = -4 + 15 = 11$

35. $50 - (-33)$
Add the opposite of -33.
$50 + 33$
83
The temperature increased 83 °F.

36. $2 - 8$
$2 + (-8)$
-6

37. $-5 - 9$
$-5 + (-9)$
-14

38. $15 - 12 - 8$
$15 + (-12) + (-8)$
$3 + (-8)$
-5

39. $6 + (-5) - 3$
$6 + (-5) + (-3)$
$1 + (-3)$
-2

40. $1 - 8 + (-6)$
$1 + (-8) + (-6)$
$-7 + (-6)$
-13

41. $4 - (-7) - 9$
$4 + 7 + (-9)$
$11 + (-9)$
2

42. $(2 - 3) - (5 - 6)$
$(2 + (-3)) - (5 + (-6))$
$-1 - (-1)$
$-1 + 1$
0

43. $5 - (-8) - (-3)$
$5 + 8 + 3$
$13 + 3$
16

44. $10 - 12 + 2$
$10 + (-12) + 2$
$-2 + 2$
0

45. Evaluate $m - n + p$ for $m = -5$, $n = 8$, and $p = -14$.
$m - n + p$
$-5 - 8 + (-14)$
$-5 + (-8) + (-14)$
$-13 + (-14)$
-27

46. Evaluate $n - m - p$ for $m = -5$, $n = 8$, and $p = -14$.
$n - m - p$
$8 - (-5) - (-14)$
$8 + 5 + 14$
$13 + 14$
27

47. Evaluate $p - m - n$ for $m = -5$, $n = 8$, and $p = -14$.
$p - m - n$
$-14 - (-5) - 8$
$-14 + 5 + (-8)$
$-9 + (-8)$
-17

48. Evaluate $m + n - p$ for $m = -5$, $n = 8$, and $p = -14$.
$m + n - p$
$-5 + 8 - (-14)$
$-5 + 8 + 14$
$3 + 14$
17

49. -13, -17, -21; Subtract 4.

50. $873 - (-393)$
$873 + 393$
1,266
The difference between the temperatures is 1,266 °F.

51. $873 - (-361)$
$873 + 361$
1,234
The difference between the temperatures is 1,234 °F.

52. $224 - (-307)$
$224 + 307$
531
The difference between the temperatures is 531 °F.

53. $136 - (-129)$
$136 + 129$
265
The difference between the temperatures is 265 °F.

54. $-9{,}500 - (-26{,}000)$
$-9{,}500 + 26{,}000$
$16{,}500$
The deepest canyon on Mars is 16,500 ft deeper than the deepest canyon on Venus.

55. Earth: $29{,}035 - (-36{,}198) = 29{,}035 + 36{,}198 = 65{,}233$
Mars: $70{,}000 - (-26{,}000) = 70{,}000 + 26{,}000 = 96{,}000$
65,233 ft (Earth); 96,000 ft(Mars)
Mars has the greatest difference.
$96{,}000 - 65{,}233 = 30{,}767$
It is 30,767 ft greater.

56. C; $5 - (-8)$

57. $m + n$ has the least absolute value.
$m + n = 2$, and $|2| = 2$
$n - m = 6$, and $|6| = 6$
$m - n = -6$ and $|-6| = 6$

LESSON 4

Think and Discuss

1. Possible answer: $-4 \cdot (-6)$, $2 \cdot 12$, $-3 \cdot (-8)$, and $24 \cdot 1$

2. Since multiplication is repeated addition, if you multiply two positive integers their product is positive. Multiplying a negative by a positive is repeated addition of a negative integer, so the product is negative. The product of two negative integers is positive.
For $-3(2 + -2) = (-6) + (6) = 0$, $(-3)(-2)$ must equal 6, not -6.

Exercises

1. $5 \cdot (-3)$
Think: $5 \cdot (-3)$ means 5 groups of -3.
$5 \cdot (-3) = (-3) + (-3) + (-3) + (-3) + (-3) = -15$

2. $5 \cdot (-2)$
Think: $5 \cdot (-2)$ means 5 groups of -2.
$5 \cdot (-2) = (-2) + (-2) + (-2) + (-2) + (-2) = -10$

3. $-3 \cdot 5$
Think: $-3 \cdot 5 = 5 \cdot -3$, or 5 groups of -3.
$-3 \cdot 5 = (-3) + (-3) + (-3) + (-3) + (-3) = -15$

4. $-4 \cdot 6$
Think: $-4 \cdot 6 = 6 \cdot -4$, or 6 groups of -4.
$-4 \cdot 6 = (-4) + (-4) + (-4) + (-4) + (-4) + (-4) = -24$

5. $(-5) \cdot (-3)$
Both signs are negative, so the product is positive.
$(-5) \cdot (-3) = 15$

6. $-2 \cdot 5$
The signs are different, so the product is negative.
$-2 \cdot 5 = -10$

7. $3 \cdot (-5)$
The signs are different, so the product is negative.
$3 \cdot (-5) = -15$

8. $-7 \cdot (-4)$
Both signs are negative, so the product is positive.
$-7 \cdot (-4) = 28$

9. $32 \div (-4)$
Think: $32 \div 4 = 8$
The signs are different, so the quotient is negative.
$32 \div (-4)$
-8

10. $-18 \div 3$
Think: $18 \div 3 = 6$
The signs are different, so the quotient is negative.
$-18 \div 3$
-6

11. $-20 \div (-5)$
Think: $20 \div 5 = 4$
The signs are the same, so the quotient is positive.
$-20 \div (-5)$
4

12. $49 \div (-7)$
Think: $49 \div 7 = 7$
The signs are different, so the quotient is negative.
$49 \div (-7)$
-7

13. $-63 \div (-9)$
Think: $63 \div 9 = 7$
The signs are the same, so the quotient is positive.
$-63 \div (-9)$
7

14. $-50 \div 50$
Think: $50 \div 10 = 5$
The signs are different, so the quotient is negative.
$-50 \div 50$
-5

15. $63 \div 0$
Remember, you cannot find an answer for division by zero.
Undefined

16. $-45 \div (-5)$
Think: $45 \div 5 = 9$
The signs are the same, so the quotient is positive.
$-45 \div (-5)$
9

17. $2{,}250 \div 5$
The signs are the same, so the quotient is positive.
$2{,}250 \div 5$
450 feet

18. $2 \cdot (-1)$
Think $2 \cdot (-1)$ means 2 groups of -1.
$2 \cdot (-1) = (-1) + (-1) = -2$

19. $-5 \cdot 2$
Think $-5 \cdot 2 = 2 \cdot -5$ means 2 groups of -5.
$-5 \cdot 2 = (-5) + (-5) = -10$

20. $-4 \cdot 2$
Think $-4 \cdot 2 = 2 \cdot -4$ means 2 groups of -4.
$-4 \cdot 2 = (-4) + (-4) = -8$

21. $3 \cdot -4$
Think $3 \cdot -4$ means 3 groups of -4.
$3 \cdot -4 = (-4) + (-4) + (-4) = -12$

22. $4 \cdot (-6)$
The signs are different, so the product is negative.
$4 \cdot (-6) = -24$

23. $-6 \cdot (-8)$
The signs are the same, so the product is positive.
$-6 \cdot (-8) = 48$

24. $-8 \cdot 4$
The signs are different, so the product is negative.
$-8 \cdot 4 = -32$

25. $-5 \cdot (-7)$
The signs are the same, so the product is positive.
$-5 \cdot (-7) = 35$

26. $48 \div (-6)$
The signs are different, so the quotient is negative.
$48 \div (-6) = -8$

27. $-35 \div (-5)$
The signs are the same, so the quotient is positive.
$-35 \div (-5) = 7$

28. $-16 \div 4$
The signs are different, so the quotient is negative.
$-16 \div 4 = -4$

29. $-64 \div 8$
The signs are different, so the quotient is negative.
$-64 \div 8 = -8$

30. $-42 \div 0$
Remember, you cannot find an answer for division by zero.
Undefined

31. $81 \div -9$
The signs are different, so the quotient is negative.
$81 \div -9 = -9$

32. $-77 \div 11$
The signs are different, so the quotient is negative.
$-77 \div 11 = -7$

33. $27 \div -3$
The signs are different, so the quotient is negative.
$27 \div -3 = -9$

34. $140 \div 35 = 4$
The diver made his descent in 4 intervals.

35. $-4 \cdot 10$
The signs are different, so the product is negative.
$-4 \cdot 10 = -40$

36. $-3 \div 0$
Remember, you cannot find an answer for division by zero.
Undefined

37. $-45 \div 15$
The signs are different, so the product is negative.
$-45 \div 15 = -3$

38. $-3 \cdot 4 \cdot (-1)$
$-12 \cdot (-1)$
12

39. $-500 \div (-10)$
The products are the same, so the product is positive.
$-500 \div (-10) = 50$

40. $5 \cdot (-4) \cdot (-2)$
$-20 \cdot (-2)$
40

41. $225 \div (-75)$
The signs are different, so the product is negative.
$225 \div (-75) = -3$

42. $0 \div -3$
Zero divided by any number is zero.
$-3 \cdot 0$
0

43. Evaluate $-2c + b$ for $b = 6$, $c = -12$.
$-2 \cdot (-12) + 6$
$24 + 6$
30

44. Evaluate $4a - b$ for $a = -5$, $b = 6$.
$4 \cdot (-5) - 6$
$-20 - 6$
-26

45. Evaluate $ab + c$ for $a = -5$, $b = 6$, $c = -12$.
$-5(6) + (-12)$
$-30 + (-12)$
-42

46. Evaluate $ac \div b$ for $a = -5$, $b = 6$, $c = -12$.
$(-5 \cdot (-12)) \div 6$
$60 \div 6$
10

47. $5 \cdot (-12) = -60$
The depth of the coral reef is -60 feet.

48. $(-3)^2 = -3 \cdot (-3) = 9$

49. $-(-2 + 1) = -(-1) = 1$

50. $8 + (-5)^3 + 7 = 8 + (-5) \cdot (-5) \cdot (-5) + 7 = 8 + (-125) + 7 = (-117) + 7 = -110$

51. $(-1)^5 \cdot (9 + 3) = (-1)^5 \cdot 12 = (-1) \cdot (-1) \cdot (-1) \cdot (-1) \cdot (-1) \cdot 12 = -1 \cdot 12 = -12$

52. $29 - (-7) - 3 = 36 - 3 = 33$

53. $-4 \cdot 14 \cdot (-25) = -56 \cdot (-25) = 1{,}400$

54. $25 - (-2) \cdot 4^2 = 25 - (-2) \cdot 16 = 25 - (-32) = 25 + 32 = 57$

55. $8 - (6 \div (-2)) = 8 - (-3) = 11$

56. $-696 \div (-137) \approx 5$
about 5 times

57. $-24 \cdot 3 = -72$
less; $-\$72$

58. $15 \cdot 5 = 75$
more; \$75

59. $-20 \cdot 3 = -60$
$18 \cdot 4 = 72$
$-60 + 72 = 12$
more; \$12

60. If the integers have opposite signs, the quotient will be negative.

61. Multiply or divide as with whole numbers. If both integers have the same sign, the product or quotient is positive. If integers have unlike signs, the product or quotient is negative.

62. $-2 \cdot (-1) \cdot 4 \cdot 2 \cdot (-3) \blacksquare -1 + (-2) + 4 + (-25) + (-10)$

$2 \cdot 8 \cdot (-3) \blacksquare -3 + (-21) + (-10)$

$16 \cdot (-3) \blacksquare -24 + (-10)$

$-48 \blacksquare -34$

$-48 < -34$

63. C; I, II, and IV

64. J; $-45 \div (-5)$

LESSON 5

Think and Discuss

1. The expression $-n + 32$ is equal to 0 when $n = 32$.

2. Possible answer: You cannot multiply an equation by zero to solve it. Both sides would equal zero, and you would lose all the information in the equation.

Exercises

1. $w - 6 = -2$

$+6 \quad +6$

$w = 4$

2. $x + 5 = -7$

$-5 \quad -5$

$x = -12$

3. $k = -18 + 11$

$k = -7$

4. $\frac{n}{-4} = 2$

$\frac{n}{-4} \cdot -4 = 2 \cdot -4$

$n = -8$

5. $-240 = 8y$

$\frac{-240}{8} = \frac{8y}{8}$

$-30 = y$

6. $-5a = 300$

$\frac{-5a}{-5} = \frac{300}{-5}$

$a = -60$

7. Let l represent this year's loss (in millions of dollars).

Loss last year: $l - \$12$ million

Loss last year: \$45 million

$l - 12 = 45$

$+12 \quad +12$

$l = 57$

This year's loss is \$57 million.

8. $b - 7 = -16$

$+7 \quad +7$

$b = -9$

9. $k + 6 = 3$

$-6 \quad -6$

$k = -3$

10. $s + 2 = -4$

$-2 \quad -2$

$s = -6$

11. $v + 14 = 10$

$-14 \quad -14$

$v = -4$

12. $c + 8 = -20$

$-8 \quad -8$

$c = -28$

13. $a - 25 = -5$

$+25 \quad +25$

$a = 20$

14. $9c = -99$

$\frac{9c}{9} = \frac{-99}{9}$

$c = -11$

15. $\frac{t}{8} = -4$

$\frac{t}{8} \cdot 8 = -4 \cdot 8$

$t = -32$

16. $-16 = 2z$

$\frac{-16}{2} = \frac{2z}{2}$

$-8 = z$

17. $\frac{n}{-5} = -30$

$\frac{n}{-5} \cdot -5 = -30 \cdot -5$

$n = 150$

18. $200 = -25p$

$\frac{200}{-25} = \frac{-25p}{-25}$

$-8 = p$

19. $\frac{l}{-12} = 12$

$\frac{l}{-12} \cdot -12 = 12 \cdot -12$

$l = -144$

20. Let a represent the temperature in Anchorage (in °F).

Nome: $a - 18$

Nome: -50

$a - 18 = -50$

$+18 \quad +18$

$a = -32$

The temperature in Anchorage was -32 °F.

21. $9y = 900$

$\frac{9y}{9} = \frac{900}{9}$

$y = 100$

22. $d - 15 = 45$

$+15 \quad +15$

$d = 60$

23. $j + 56 = -7$

$-56 \quad -56$

$j = -63$

24. $\frac{s}{-20} = 7$

$\frac{s}{-20} \cdot (-20) = 7 \cdot (-20)$

$s = -140$

25. $-85 = -5c$

$\frac{-85}{-5} = \frac{-5c}{-5}$

$17 = c$

26. $v - 39 = -16$

$+39 \quad +39$

$v = 23$

27. $11y = -121$

$\frac{11y}{11} = \frac{-121}{11}$

$y = -11$

28. $\frac{n}{36} = 9$

$\frac{n}{36} \cdot 36 = 9 \cdot 36$

$n = 324$

29. $w + 41 = 0$

$-41 \quad -41$

$w = -41$

30. $\frac{r}{238} = 8$

$\frac{r}{238} \cdot 238 = 8 \cdot 238$

$r = 1{,}904$

31. $-23 = x + 35$

$-35 \quad -35$

$-58 = x$

32. $0 = -15m$

$\frac{0}{-15} = \frac{-15m}{-15}$

$0 = m$

33. $4x = 2 + 14$

$4x = 16$

$\frac{4x}{4} = \frac{16}{4}$

$x = 4$

34. $c + c + c = 6$

$3c = 6$

$\frac{3c}{3} = \frac{6}{3}$

$c = 2$

35. $t - 3 = 4 + 2$

$t - 3 = 6$

$+3 \quad +3$

$t = 9$

36. $3a = 180$

$\frac{3a}{3} = \frac{180}{3}$

$a = 60$

The measure of each angle is 60°.

37. $42d = 126$

$\frac{42d}{42} = \frac{126}{42}$

$d = 3$

Each day, Herb will run 3 miles.

38. a. $225 = s - 55$
$+55 \quad +55$
$280 = s$
\$280

b. $280 = w + 40$
$-40 \quad -40$
$240 = w$
\$240

39. $-13 + p = 8$
$-13 + p = 8$
$+13 \quad +13$
$p = 21$

40. $\frac{x}{4} = -7$
$\frac{x}{4} = -7$
$\frac{x}{4} \cdot 4 = -7 \cdot 4$
$x = -28$

41. $t - 9 = -22$
$t - 9 = -22$
$+9 \quad +9$
$t = -13$

42. $373 = k + 100$
$373 = k + 100$
$-100 \quad -100$
$273 = k$
The freezing point of water is 273 K.

43. Theme or amusement parks is 4%. $4 \cdot 5 = 20$, and the only category with 20% is oceans or beaches.

44. Mountains (14%) equal state or national parks (6%) plus some other destination (d).
$14 = 6 + d$
$-6 \quad -6$
$8 = d$
8% corresponds to lakes.

45. The amounts in A add to \$47, not \$93, so A is not the answer.
In B, Matthew earns more than Allie, so B is not the answer. C; A: \$58; M: \$35

46. Use addition to solve equations with subtraction, subtraction with addition, multiplication with division, and division with multiplication. Follow all rules for computing with integers.

47. Possible answer: $5 \cdot 3 + p = 31$

48. A; $-15m = 60$
$\frac{-15m}{-15} = \frac{60}{-15}$
$m = -4$

49. H; $x + x = 4$
$2x = 4$
$\frac{2x}{2} = \frac{4}{2}$
$x = 2$

READY TO GO ON?

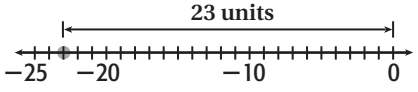
1. $5 > -8$

2. $-2 > -6$

3. $-4 < 3$

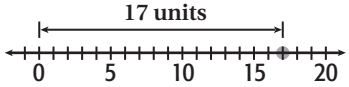
4.

5.



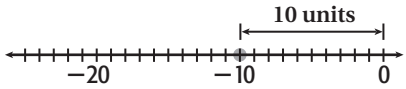
-23 is 23 units from 0, so $|-23| = 23$.

6.



17 is 17 units from 0, so $|17| = 17$.

7.



8. $-6 + 3 = -3$

9. $5 + (-9) = -4$

10. $-7 + (-11) = -18$

11. Evaluate $p + t$ for $p = 5$, $t = -18$.
$p + t$
$5 + (-18)$
-13

12. Evaluate $p + t$ for $p = -4$, $t = -13$.
$p + t$
$-4 + (-13)$
-17

13. Evaluate $p + t$ for $p = -37$, $t = 39$.
$p + t$
$-37 + 39$
2

14. $-21 - (-7) = -21 + 7 = -14$

15. $9 - (-11) = 9 + 11 = 20$

16. $6 - 17 = 6 + (-17) = -11$

17. $2{,}314 - (-7) = 2{,}314 + 7 = 2{,}321$ feet

18. $-7 \cdot 3 = -21$

19. $30 \div (-15) = -2$

20. $-5 \cdot (-9) = 45$

21. Let r represent the number of rope lengths.
$65r = 585$
$\frac{65r}{65} = \frac{585}{65}$
$r = 9$

22. $3x = 30$
$\frac{3x}{3} = \frac{30}{3}$
$x = 10$

23. $k - 25 = 50$
$+25 \quad +25$
$k = 75$

24. $y + 16 = -8$
$-16 \quad -16$
$y = -24$

25. Let x represent the number of students who did projects last year.
$72 = x + 23$
$-23 \quad -23$
$49 = x$
Last year 49 students did projects for the science fair.

LESSON 6

Think and Discuss

1. Possible answer: Divide the numerator by the denominator.

2. Possible answer: The denominator will be ten thousand because the place value of the last decimal tells what power of ten to use as the denominator. The numerator will be 2,048 because the numbers to the right of the decimal point becomes the numerator.

Exercises

1. $7\overline{)4.00}$

-35

50

-49

1

2. $8\overline{)21.000}$

-16

50

-48

20

-16

40

-40

0

$\frac{21}{8} \approx 2.63$

3. $6\overline{)11.000}$

-6

50

-48

20

-18

20

-18

2

$\frac{11}{6} \approx 1.83$

4. $9\overline{)7.000}$

-63

70

-63

70

-63

7

$\frac{7}{9} \approx 0.78$

5. $\frac{3}{25} = 3 \div 25 = 0.12$

6. $\frac{7}{10} = 7 \div 10 = 0.7$

7. $\frac{1}{20} = 1 \div 20 = 0.05$

8. $\frac{3}{5} = 3 \div 5 = 0.6$

9. $0.008 = \frac{8}{1{,}000} = \frac{8 \div 8}{1{,}000 \div 8} = \frac{1}{125}$

10. $-0.6 = \frac{-6}{10} = \frac{-6 \div 2}{10 \div 2} = \frac{-3}{5}$

11. $-2.05 = -2\frac{5}{100} = -2\frac{5 \div 5}{100 \div 5} = -2\frac{1}{20}$

12. $3.75 = 3\frac{75}{100} = 3\frac{75 \div 25}{100 \div 25} = 3\frac{3}{4}$

13. $\frac{103}{143} = 103 \div 143 \approx 0.720$

14. $10\overline{)9.0}$

$\frac{9}{10} = 0.9$

15. $5\overline{)32.0}$

$\frac{32}{5} = 6.4$

16. $25\overline{)18.00}$

$\frac{18}{25} = 0.72$

17. $8\overline{)7.000}$

$\frac{7}{8} \approx 0.88$

18. $11\overline{)16.000}$

$\frac{16}{11} \approx 1.45$

19. $500\overline{)500}$

$\frac{500}{500} = 1$

20. $3\overline{)17.000}$

$\frac{17}{3} \approx 5.67$

21. $12\overline{)23.000}$

$\frac{23}{12} \approx 1.92$

22. $\frac{5}{4} = 5 \div 4 = 1.25$

23. $\frac{4}{5} = 4 \div 5 = 0.8$

24. $\frac{15}{25} = 15 \div 25 = 0.6$

25. $\frac{11}{20} = 11 \div 20 = 0.55$

26. $0.45 = \frac{45}{100} = \frac{9}{20}$

27. $0.01 = \frac{1}{100}$

28. $-0.25 = -\frac{25}{100} = -\frac{1}{4}$

29. $-0.08 = -\frac{8}{100} = -\frac{2}{25}$

30. $1.8 = \frac{18}{10} = \frac{9}{5}$ or $1\frac{4}{5}$

31. $15.25 = \frac{1{,}525}{100} = \frac{61}{4}$ or $15\frac{1}{4}$

32. $5.09 = \frac{509}{100}$ or $5\frac{9}{100}$

33. $8.375 = \frac{8{,}375}{1{,}000} = \frac{67}{8}$ or $8\frac{3}{8}$

34. $\frac{73}{86} = 0.849$

35. $8\frac{3}{4} = 8.75 = 8\frac{6}{8}$

36. $0.66 = \frac{66}{100} = \frac{33}{50}$

37. $5.05 = 5\frac{1}{20} = 5\frac{5}{100}$

38. $\frac{8}{25} = 0.32 = \frac{16}{50}$

39. $15.35 = 15\frac{7}{20} = \frac{307}{20}$

40. $8\frac{3}{8} = 8.375 = \frac{67}{8}$

41. $4\frac{3}{1{,}000} = 4.003$, $\frac{4{,}003}{1{,}000}$

42. $3\frac{1}{3} = \frac{10}{3} = 3.\overline{3}$

43. $\frac{3}{4}$ and 0.75; yes

44. $\frac{7}{20}$ and 0.45; no

45. $\frac{11}{25}$ and 0.55; no

46. 0.8 and $\frac{4}{5}$; yes

47. 0.275 and $\frac{11}{40}$; yes

48. $1\frac{21}{25}$ and 1.72; no

49. 0.74 and $\frac{16}{25}$; no

50. 0.35 and $\frac{7}{20}$; yes

51. $18.05 = 18\frac{1}{20}$

$18.04 = 18\frac{1}{25}$

$18.55 = 18\frac{11}{20}$

52. $\frac{9}{25} = 0.36$

$17.84 + 0.36 = 18.20$

October 18

53. a. Decimals are easier to compare, add, and subtract. Decimals written to the nearest hundredth also represent the dollar amount written to the nearest cent.

b. Possible answer:

$\frac{5}{32} = 0.15625$; $\frac{1}{8} = 0.125$; $\frac{3}{16} = 0.1875$

54. $\frac{1}{9} = 0.\overline{1}$

$\frac{2}{9} = 0.\overline{2}$

$\frac{8}{9} = 0.\overline{8}$

55. D; $\frac{25}{80}$

56. $\frac{6}{17} = 6 \div 17 = 0.35$

LESSON 7

Think and Discuss

1. Write the fraction with a common denominator and then compare numerators.

2. Compared to -0.31, -0.325 has the greatest absolute value. However, since it is to the left of -0.31 on the number line, -0.325 is the smaller number.

Exercises

1. $\frac{3}{5} < \frac{4}{5}$

2. $-\frac{5}{8} > -\frac{7}{8}$

3. Both fractions can be written with a denominator of 21.

$-\frac{2}{3} = \frac{-2 \cdot 7}{3 \cdot 7} = -\frac{14}{21}$

$-\frac{4}{7} = \frac{-4 \cdot 3}{7 \cdot 3} = -\frac{12}{21}$

$-\frac{14}{21} < -\frac{12}{21}$, and so $-\frac{2}{3} < -\frac{12}{21}$

4. Both fractions can be written with a denominator of 15.

$3\frac{4}{5} = 3\frac{4 \cdot 3}{5 \cdot 3} = 3\frac{12}{15}$

$3\frac{2}{3} = 3\frac{2 \cdot 5}{3 \cdot 5} = 3\frac{10}{15}$

$3\frac{12}{15} > 3\frac{10}{15}$, and so $3\frac{4}{5} > 3\frac{2}{3}$.

5. Line up the decimal points.
0.622
0.625
Compare the thousandths; $2 < 5$.
$0.622 < 0.625$

6. Line up the decimal points.
0.405
0.450
Compare: 405 to 450.
$0.405 < 0.450$

7. Line up the decimal points.
-3.822
-3.819
Compare the hundredths: $2 > 1$.
$-3.822 < -3.819$

8. Write as decimals with the same number of places.
$0.55\overline{5}$, 0.750, 0.505
Place the decimals in order.
$0.505 < 0.55\overline{5} < 0.750$
$0.505, 0.\overline{55}, \frac{3}{4}$

9. Write as decimals with the same number of places.
2.50, 2.05, -2.60
Place the decimals in order.
$-2.60 < 2.05 < 2.50$
$-\frac{13}{5}$, 2.05, 2.5

10. Write as decimals with the same number of places.
0.625, -0.875, 0.877
Place the decimals in order.
$-0.875 < 0.625 < 0.877$
$-0.875, \frac{5}{8}$, 0.877

11. $\frac{6}{11} < \frac{7}{11}$

12. $-\frac{5}{9} > -\frac{6}{9}$

13. $-\frac{5}{6} = -\frac{15}{18}$
$-\frac{8}{9} = -\frac{16}{18}$
$-\frac{15}{18} > -\frac{16}{18}$
$-\frac{5}{6} > -\frac{8}{9}$

14. $10\frac{3}{4} = 10\frac{15}{20}$
$10\frac{3}{5} = 10\frac{12}{20}$
$10\frac{15}{20} > 10\frac{12}{20}$
$10\frac{3}{4} > 10\frac{3}{5}$

15. $\frac{5}{7} > \frac{2}{7}$

16. $-\frac{3}{4} < \frac{1}{4}$

17. $\frac{7}{4} > -\frac{1}{4}$

18. $-\frac{2}{3} < \frac{4}{3}$

19. $3.8 > 3.6$

20. $0.088 < 0.109$

21. $4.\overline{26} < 4.266$

22. $-1.902 < 0.920$

23. $-0.7 < -0.07$

24. $3.\overline{08} < 3.808$

25. Write as decimals with the same number of places.
0.700, 0.755, 0.625
Place the decimals in order.
$0.625 < 0.700 < 0.755$
$\frac{5}{8}$, 0.7, 0.755

26. Write as decimals with the same number of places.
1.82, 1.60, 1.80
Place the decimals in order.
$<1.80 < 1.82$
$1.6, 1\frac{4}{5}$, 1.82

27. Write as decimals with the same number of places.
-2.25, 2.05, 2.10
Place the decimals in order.
$-2.25, <2.05 < 2.10$
-2.25, 2.05, $\frac{21}{10}$

28. Write as decimals with the same number of places.
$-3.0202\ldots$, -3.0200, 1.5000
Place the decimals in order.
$-3.\overline{02}$, -3.02, $1\frac{1}{2}$

29. Write as decimals with the same number of places.
2.88, -2.98, -2.90
Place the decimals in order.
$-2.98 < -2.90 < 2.88$
$-2.98, -2\frac{9}{10}$, 2.88

30. Write as decimals with the same number of places.
0.83, 0.80, 0.82
Place the decimals in order.
$0.80 < 0.82 < 0.83$
$\frac{4}{5}$, 0.82, $\frac{5}{6}$

31. $\frac{3}{4} = 0.75$
$0.75 > 0.70$
$\frac{3}{4}$ is greater.

32. $0.999 < 1.0$
1.0 is greater.

33. $\frac{7}{8} = \frac{35}{40}$
$\frac{13}{20} = \frac{26}{40}$
$\frac{35}{40} > \frac{26}{40}$
$\frac{7}{8}$ is greater.

34. $-0.93 < 0.2$
0.2 is greater.

35. $0.32 > 0.088$
0.32 is greater.

36. $-\frac{1}{2} < -0.05$
$-0.5 < -0.05$
-0.05 is greater.

37. $-\frac{9}{10} = -\frac{72}{80}$
$-\frac{7}{8} = -\frac{70}{80}$
$-\frac{72}{80} < -\frac{70}{80}$
$-\frac{9}{10} < -\frac{7}{8}$
$-\frac{7}{8}$ is greater.

38. $23.44 > 23$
23.44 is greater.

39. Saturn (0.69), Jupiter and Uranus (1.32), Neptune (1.64), Pluto (2.05), Mars (3.93), Venus (5.20), Mercury (5.43), Earth (5.52)

40. a. $\frac{22}{24} = \frac{11}{12}$

b. $0.75 = \frac{3}{4} = \frac{9}{12}$

$\frac{11}{12} > \frac{9}{12}$

Angie

41. $\frac{3}{4} \cdot 24 = 18$

$18 > 8$

Sloths sleep more per day.

42. Because $\frac{5}{9} < \frac{3}{5}$, her usage is less than average.

43. The chef added one half-cupful too many.

44. Possible answer: Write the mixed number as an improper fraction, and divide the numerator by the denominator to get the number in decimal form. The two decimal numbers can then be compared.

45. Earth: $\frac{7}{60} \approx 0.117$

Hadean: ≈ 0.175

$0.175 > 0.117$, so the Hadean eon was longer.

46. D; $0.71 = 0.710$

$\frac{5}{8} = 0.625$

$0.65 = 0.65$

$\frac{5}{7} \approx 0.714$

$\frac{5}{7}$

47. J; Spider, tortoise, sloth, snail

READY TO GO ON?

1. $\frac{7}{10} = 7 \div 10 = 0.7$

2. $\frac{5}{8} = 5 \div 8 = 0.63$

3. $\frac{2}{3} = 2 \div 3 = 0.67$

4. $\frac{14}{15} = 14 \div 15 = 0.93$

5. $0.22 = \frac{22}{100} = \frac{11}{50}$

6. $-0.135 = -\frac{135}{1{,}000} = -\frac{27}{200}$

7. $-4.06 = -4\frac{6}{100} = -4\frac{3}{50}$

8. $0.07 = \frac{7}{100}$

9. $\frac{24}{30} = \frac{4}{5} = 0.8$

10. $\frac{29}{70} = 29 \div 70 = 0.414$

11. $\frac{3}{7} = \frac{12}{28}$
$\frac{2}{4} = \frac{14}{28}$
$\frac{12}{28} < \frac{14}{28}$
$\frac{3}{7} < \frac{2}{4}$

12. $-\frac{1}{8} = -\frac{11}{88}$
$-\frac{2}{11} = -\frac{16}{88}$
$-\frac{11}{88} > -\frac{16}{88}$
$-\frac{1}{8} > -\frac{2}{11}$

13. $\frac{5}{4} = \frac{25}{20}$
$\frac{4}{5} = \frac{16}{20}$
$\frac{25}{20} > \frac{16}{20}$
$\frac{5}{4} > \frac{4}{5}$

14. $-1\frac{2}{3} = -1\frac{4}{6}$
$\frac{1}{2} = \frac{3}{6}$
$-1\frac{4}{6} < \frac{3}{6}$
$-1\frac{2}{3} < \frac{1}{2}$

15. $0.521 < 0.524$

16. $-0.26 > -0.626$

17. $3.001 < 3.010$

18. $2.05 > -2.50$

19. Write as decimals with the same number of places.
0.429, -0.372, -0.667, 0.500
Place the decimals in order.
$-0.667 < -0.372 < 0.429 < 0.500$
$-\frac{2}{3}$, -0.372, $\frac{3}{7}$, 0.5

20. Write as decimals with the same number of places.
2.82, 0.80, 2.91, 0.9
Place the decimals in order.
$0.8 < 0.9 < 2.82 < 2.91$
$\frac{4}{5}$, 0.9, $2\frac{9}{11}$, 2.91

21. Write as decimals with the same number of places.
-5.36, 2.36, -5.33, -2.5
Place the decimals in order.
$-5.36 < -5.33 < -2.5 < 2.36$
-5.36, $-5\frac{1}{3}$, $-2\frac{3}{6}$, 2.36

22. Write as decimals with the same number of places.
8.750, 0.875, 0.800, 1.143
Place the decimals in order.
$0.800 < 0.875 < 1.143 < 8.750$
0.8, $\frac{7}{8}$, $\frac{8}{7}$, 8.75

23. Sunday: $\frac{2}{5} = 0.400$

Monday: $\frac{5}{8} = 0.625$

Wednesday: $0.57 = 0.570$
$0.400 < 0.570 < 0.625$
Sunday, Wednesday, Monday

STUDY GUIDE: REVIEW

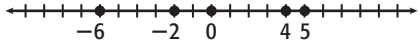
1. rational number; integer; terminating decimal

2. integers; opposite

3. $-8 > -15$

4. $-7 < 7$

5.



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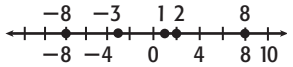

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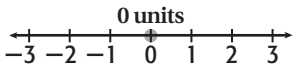
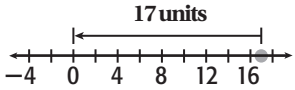


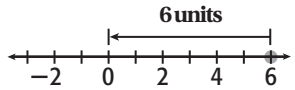
The absolute value is 0.

8.



The absolute value is 17.

9.



The absolute value is 6.

10. Find the difference of the absolute values. Use the sign of the integer with the greater absolute value.
$-8 + 5$
-3

11. Find the difference of the absolute values. Use the sign of the integer with the greater absolute value.
$7 + (-6)$
1

12. Find the sum of the absolute values. Use the sign of the two integers.
$-16 + (-40)$
-56

13. Find the difference of the absolute values. Use the sign of the integer with the greater absolute value.
$-9 + 18$
9

14. Find the difference of the absolute values. Use the sign of the integer with the greater absolute value.
$-2 + 16$
14

15. First combine the positive integers. Then find the difference of the absolute values. Use the sign of the integer with the greater absolute value.
$12 + (-18) + 1$
$13 + (-18)$
-5

16 $-9 + 20$
11
The temperature rose to 11 °F by 10 A.M.

17. Add the opposite of 2.
$8 + (-2)$
6

18. Add the opposite of 19.
$10 + (-19)$
-9

19. Add the opposite of -5.
$-6 + 5$
-1

20. Add the opposite of 4.
$-5 + (-4)$
-9

21. Add the opposite of -5 and the opposite of 8.
$6 + 5 + (-8)$
3

22. Add the opposite of -3 and the opposite of -1.
$10 + 3 + 1$
14

23. Evaluate $a - b$ for $a = -2$ and $b = 8$
$a - b$
$-2 - 8$
-10

24. The signs are different, so the product is negative.
$5 \cdot (-10)$
-50

25. The signs are the same, so the quotient is positive.
$-27 \div (-9)$
3

26. The signs are the same, so the product is positive.
$-2 \cdot (-8)$
16

27. The signs are different, so the quotient is negative.
$-40 \div 20$
-2

28. The signs are different, so the product is negative.
$-3 \cdot 4$
-12

29. The signs are different, so the quotient is negative.
$45 \div (-15)$
-3

30. $\$15 \times 8 = \$120$
John took \$120 out of his account.

31. $7y = 70$

$$\frac{7y}{7} = \frac{70}{7}$$

$$y = 10$$

32. $d - 8 = 6$

$d - 8 + 8 = 6 + 8$

$d = 14$

33. $j + 23 = -3$

$j + 23 - 23 = -3 - 23$

$j = -26$

34. $\frac{n}{36} = 2$

$\frac{n}{36} \cdot 36 = 2 \cdot 36$

$n = 72$

35. $-26 = -2c$

$\frac{-26}{-2} = \frac{-2c}{-2}$

$13 = c$

36. $28 = -7m$

$\frac{28}{-7} = \frac{-7m}{-7}$

$-4 = m$

37. $-30 - (-12)$
Add the opposite of –12.
$-30 + 12$
-18
The scuba diver will have to rise 18 feet.

38. $0.25 = \frac{25}{100} = \frac{25 \div 25}{100 \div 25} = \frac{1}{4}$

39. $-0.004 = \frac{-4}{1{,}000} = \frac{-4 \div 4}{1{,}000 \div 4} = \frac{-1}{250}$

40. $0.05 = \frac{5}{100} = \frac{1}{20}$

41. $\frac{7}{2} = 7 \div 2 = 3.5$

42. $\frac{3}{5} = 3 \div 5 = 0.6$

43. $\frac{2}{3} = 2 \div 3 = 0.\overline{6}$

44. 5 is in the hundredths place.

$$0.25 = \frac{25}{100} = \frac{25 \div 25}{100 \div 25} = \frac{1}{4}$$

45. $\frac{4}{5} \square 0.81$

$\frac{4}{5} \square \frac{81}{100}$

$\frac{4 \cdot 20}{5 \cdot 20} \square \frac{81}{100}$

$\frac{80}{100} < \frac{81}{100}$

46. $0.22 \square \frac{3}{20}$

$0.22 \square \frac{3}{20}$

$\frac{22}{100} \square \frac{3}{20}$

$\frac{22}{100} \square \frac{3 \cdot 5}{20 \cdot 5}$

$\frac{22}{100} > \frac{15}{100}$

47. $-\frac{3}{5} \square -1.5$

$-\frac{3}{5} \square -\frac{3}{2}$

$-\frac{3 \cdot 2}{5 \cdot 2} \square -\frac{3 \cdot 5}{2 \cdot 5}$

$-\frac{6}{10} \square -\frac{15}{10}$

$-\frac{3}{5} > -\frac{3}{2}$

48. $1\frac{1}{8} \square 1\frac{2}{9}$

$\frac{9}{8} \square \frac{11}{9}$

$\frac{9 \cdot 9}{8 \cdot 9} \square \frac{11 \cdot 8}{9 \cdot 8}$

$\frac{81}{72} \square \frac{88}{72}$

$1\frac{1}{8} < 1\frac{2}{9}$

49. $\frac{6}{13} = \frac{6}{13} = \frac{600}{1{,}300}$

$0.58 = \frac{58}{100} = \frac{754}{1{,}300}$

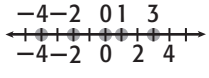
$-0.55 = -\frac{55}{100} = \frac{-715}{1{,}300}$

$\frac{1}{2} = \frac{650}{1{,}300}$

$-0.55, \frac{6}{13}, \frac{1}{2}, 0.58$

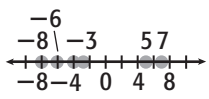
CHAPTER TEST

1.



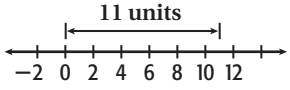
$-4, -2, 0, 1, 3$

2.



$-8, -6, -3, 5, 7$

3.



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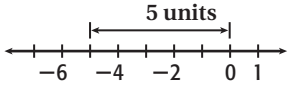

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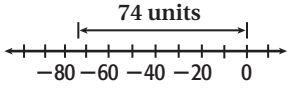

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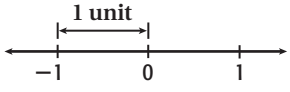

7. $-7 + (-3) = -10$

8. $-6 - 3 = -9$

9. $17 - (-9) - 8$

$26 - 8$

18

10. $102 + (-97) + 3$

$5 + 3$

8

11. $-3 \cdot 20 = -60$

12. $-36 \div 12 = -3$

13. $-400 \div (-10) = 40$

14. $-5 \cdot (-2) \cdot 9$

$10 \cdot 9$

90

15. Evaluate $a + b$ for $a = -3$ and $b = -7$

$a + b$

$-3 + (-7)$

-10

16. Evaluate $b - a$ for $a = -3$ and $b = -7$

$b - a$

$-7 - (-3)$

$-7 + 3$

-4

17. Evaluate $a + 2b$ for $a = -3$ and $b = -7$

$a + 2b$

$-3 + 2(-7)$

$-3 + (-14)$

-17

18. Evaluate ab for $a = -3$ and $b = -7$

ab

$-3(-7)$

21

19. $w - 4 = -6$

$+4 \quad +4$

$w = -2$

20. $x + 5 = -5$

$-5 \quad -5$

$x = -10$

21. $-6a = 60$

$\frac{-6a}{-6} = \frac{60}{-6}$

$a = -10$

22. $\frac{n}{-4} = 12$

$\frac{n}{-4} \cdot (-4) = 12 \cdot (-4)$

$n = -48$

23. $x + 9 = 52$

$-9 \quad -9$

$x = 43$

Rebecca's team has won 43 matches.

24. $\frac{3}{50} = 3 \div 50 = 0.06$

25. $\frac{25}{10} = 25 \div 10 = 2.5$

26. $3.15 = 3\frac{15}{100} = 3\frac{15 \div 5}{100 \div 5} = 3\frac{3}{20}$

27. $0.004 = \frac{4}{1{,}000} = \frac{4 \div 4}{1{,}000 \div 4} = \frac{1}{250}$

28. $\frac{18}{52} = \frac{18 \div 2}{52 \div 2} = \frac{9}{26}$

$\frac{9}{26} = 9 \div 26 \approx 0.346$

$\frac{9}{26}; 0.346$

29. $\frac{2}{3} \square 0.62$

$0.\overline{6} \square 0.62$

$0.\overline{6} > 0.62$

30. $1.5 \square 1\frac{6}{20}$

$1\frac{5}{10} \square 1\frac{3}{10}$

$\frac{15}{10} \square \frac{13}{10}$

$\frac{15}{10} > \frac{13}{10}$

$1.5 > 1\frac{6}{20}$

31. $-\frac{9}{7} \square -1$

$-1\frac{2}{7} \square -1$

$-1\frac{2}{7} < -1$

$-\frac{9}{7} < -1$

32. $\frac{11}{5} \square 1\frac{2}{3}$

$\frac{11}{5} \square \frac{5}{3}$

$\frac{11 \cdot 3}{5 \cdot 3} \square \frac{5 \cdot 5}{3 \cdot 5}$

$\frac{33}{15} \square \frac{25}{15}$

$\frac{33}{15} > \frac{25}{15}$

$\frac{11}{5} > 1\frac{2}{3}$

33. Write as decimals with the same number of places.

0.50, 0.25, -0.40

Place the decimals in order.

-0.40, 0.25, 0.50

-0.4, $\frac{1}{4}$, 0.5

34. Write as decimals with the same number of places.

0.66, $0.6\overline{6}$, 0.67

Place the decimals in order.

0.66, $0.6\overline{6}$, 0.67

-0.66, $\frac{2}{3}$, 0.67

35. Write as decimals with the same number of places.

-4.20, -4.30, 4.1, -4.75

Place the decimals in order.

-4.75, -4.30, -4.20, 4.1

$-4\frac{3}{4}$, -4.3, -4.2, 4.1

36. Write as decimals with the same number of places.

7.5, $7.\overline{3}$, 7.4

Place the decimals in order.

$7.\overline{3}$, 7.4, 7.5

$7\frac{1}{3}$, 7.4, $\frac{45}{6}$