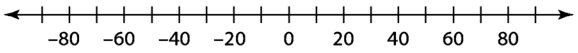
CHAPTER 1

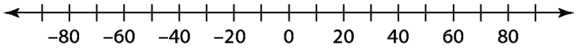
Whole Numbers and Integers

Directions: Answer the following questions. For multiple-choice questions, choose the best answer. For other questions, write your answer in the space provided below the question. Answers begin on page 87.

1. Plot the number 47 on the number line.



2. Plot the number −25 on the number line.



3. Place the correct symbol, < or >, between the numbers: −258 _____ 95

4. Place the correct symbol, < or >, between the numbers: −47 _____ −44

5. Place the correct symbol, < or >, between the numbers: 54 _____ −128

6. What is the opposite of −5, simplified?

   A. −(−5)
   B. $\frac{1}{5}$
   C. $-\frac{1}{5}$
   D. 5

7. What is the simplified form of the opposite of the opposite of 12?

   A. −(−12)
   B. 12
   C. $\frac{1}{12}$
   D. $-\frac{1}{12}$

8. What is |−42|, simplified?

   A. 42
   B. (−42)
   C. −42
   D. |42|

9. What is the absolute value of 7?

   A. |7|
   B. −7
   C. (7)
   D. 7

10. Which quadrant has positive *x* values and negative *y* values?

    A. QI
    B. QII
    C. QIII
    D. QIV

11. Which quadrant has negative *x* values and negative *y* values?

    A. QI
    B. QII
    C. QIII
    D. QIV

12. Which point is the reflection of (−4, 7) in the *x*-axis?

    A. (−4, −7)
    B. (4, −7)
    C. (7, −4)
    D. (−7, 4)

13. Which point is the reflection of (0, −2) in the *x*-axis?

    A. (2, 0)
    B. (0, 2)
    C. (−2, 0)
    D. (0, −2)

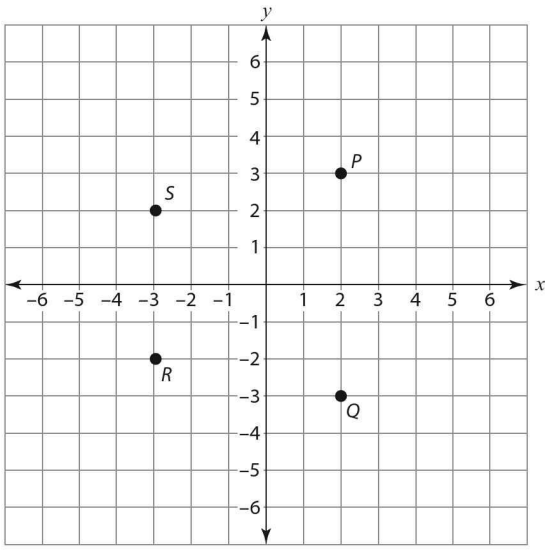
14. Which point is the reflection of (2, –5) in the *y*-axis?

    A. (–2, 5)
    B. (5, –2)
    C. (–5, 2)
    D. (–2, –5)

15. Which point is the reflection of (0, –3) in the *y*-axis?

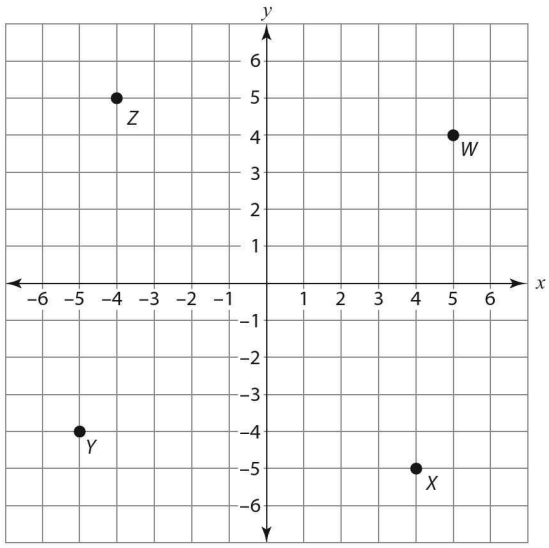
    A. (–3, 0)
    B. (3, 0)
    C. (0, –3)
    D. (0, 3)

16. In the diagram, which point has coordinates (–3, 2)?



    A. *P*
    B. *Q*
    C. *R*
    D. *S*

17. In the diagram, which point has coordinates (4, –5)?



    A. *W*
    B. *X*
    C. *Y*
    D. *Z*

18. Which statement is true?

    A. $-3 < -7$
    B. –3 is to the right of –7 of the number line.
    C. $|-3| > |-7|$
    D. –3 is to the left of –7 on the number line.

19. Death Valley in California has an elevation of –282 feet. The Dead Sea in the Middle East has an elevation of –1360 feet. Which of the following must be true?

    A. The Dead Sea is drier than Death Valley.
    B. Death Valley is closer to sea level.
    C. There are heavier rocks in the Dead Sea.
    D. Death Valley is hotter than the Dead Sea.

20. The absolute value expression $|-7|$ represents

    A. the distance from 7 to –7.
    B. the distance from 7 to 0.
    C. the distance from –7 to 7.
    D. the distance from –7 to 0.

21. What is the geometric meaning of $-5 < -2$?

    A. -2 is not as negative as -5.
    B. -5 is to the left of -2 on the number line.
    C. -5 is smaller than -2.
    D. -2 is to the right of -5 on the number line.

22. Albert has a bank balance of -65 dollars. George has a balance of -44 dollars. Zoe's balance is -7 dollars; Pat's balance is -82 dollars. Who owes more money to the bank?

    A. Albert
    B. George
    C. Zoe
    D. Pat

23. What is the greatest common factor of 42 and 36?

    A. 4
    B. 6
    C. 7
    D. 9

24. What is the least common multiple of 6 and 9?

    A. 9
    B. 18
    C. 36
    D. 54

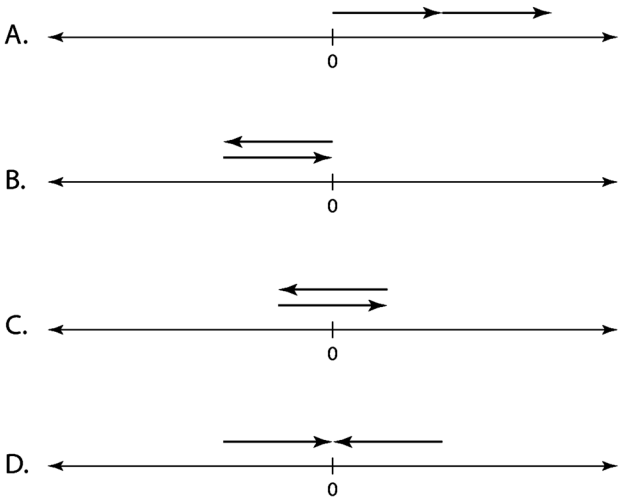
25. Which situation describes quantities combining to make 0?

    A. An account overdrawn by \$1367 receives a payroll deposit of \$756 and a tax refund deposit of \$621.
    B. 5 people chip in \$17 each to help settle a friend's \$85 electricity bill.
    C. A person contributes \$15 to pay for his share of a \$60 dinner bill; his 4 companions all generously do the same.
    D. Oil leaks out of a full 75,000-gallon tank at the rate of 1500 gallons each day for 7 weeks before someone notices.

26. On a number line, where is the number $-2 + (-7)$?

    A. 7 units to the right of -2
    B. -7 units to the left of -2
    C. -7 units to the right of -2
    D. 7 units to the left of -2

27. Which number line shows that a number and its opposite have a sum of 0?



28. Compute $3 - 7$.

    A. -10
    B. -4
    C. 4
    D. 10

29. Compute $5 - (-6)$.

    A. -11
    B. -1
    C. 1
    D. 11

30. Add $7 + (-5) + (-9)$.

    A. -7
    B. -11
    C. -21
    D. -9

31. Compute $-3 - (-8) + (-4) - 5$.

    A. -15
    B. -10
    C. -4
    D. 4

32. Add $-9 + 3 + (-4)$.

    A. 2
    B. -2
    C. -10
    D. -16

33. Compute $-8 - (-10) - 5$.

A. -3
B. -23
C. -7
D. 3

34. Multiply $-7(-9)$.

A. -16
B. -63
C. 63
D. 16

35. Multiply $2(-4)(-1)$.

A. -8
B. 8
C. 7
D. -3

36. Divide $-32 \div 8$.

A. -2
B. 4
C. -4
D. 2

37. Divide $42 \div (-6)$.

A. -7
B. 36
C. -36
D. 7

38. Divide $-72 \div (-9)$.

A. 8
B. -63
C. -81
D. -8

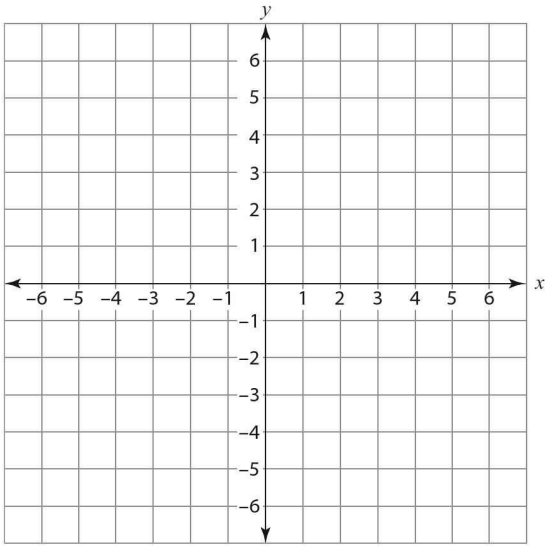
39. Which of the following is NOT equal to -5?

A. $-20 \div 4$
B. $20 \div (-4)$
C. $-20 \div (-4)$
D. $-(20 \div 4)$

40. Which expression represents the distance between -5 and 6?

A. $|-5| + |6|$
B. $|-5 + 6|$
C. $|-5| - |6|$
D. $|-5 - 6|$

41. Plot and label the points



A (1, −5), *B* (−2, −3), *C* (−5, 1)

42. A rocket is about to launch. At T:−52 seconds the guidance system starts its final automatic test. The test is over at T:−17 seconds. How long did the test take?

A. 49 seconds
B. 45 seconds
C. 35 seconds
D. 39 seconds

43. Which of the following is undefined?

A. $\dfrac{-2+2}{8+(-4)}$
B. $\dfrac{5+(-2)}{-7+7}$
C. $\dfrac{4-(-1)}{6-3}$
D. $\dfrac{-3+(-1)}{4-(-6)}$

44. Arrange these numbers in order from smallest to largest:

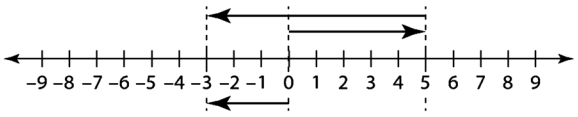
    −15, −20, 13, −2, −8, 6, 0

45. What is the distance between −7 and 6 on the number line?

    A. −13
    B. −1
    C. 1
    D. 13

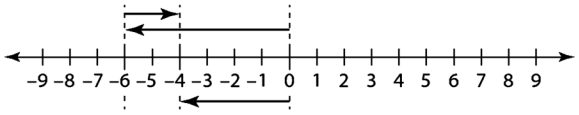
46. What is −0?

47. Which addition problem is shown by the number line?



    A. −3 + (−8) = 5
    B. −3 + 5 = −8
    C. 5 + (−8) = −3
    D. −3 + (−5) = −8

48. Which subtraction problem is shown by the number line?



    A. −6 − (−2) = −4
    B. 2 − 6 = −4
    C. −2 − 4 = −6
    D. −4 − 2 = −6

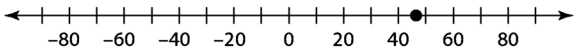
49. Frank hears that the average temperature at a science station in Antarctica one winter is −40°C. He knows he can change the Celsius temperature into Fahrenheit by multiplying the given temperature by 9, adding 160, and then dividing by 5. What temperature should Frank come up with?

    A. −104°F
    B. −40°F
    C. 40°F
    D. 104°F

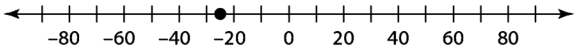
50. Compute −7(−5) − 4(−8 − 6) ÷ (−2).

    A. −217
    B. 63
    C. 31
    D. 7

Chapter 1 Whole Numbers and Integers

1. 

47 is closer to 50 than to 40.

2. 

−25 is negative, so it is to the left of 0.

3. **<** Any negative number is less than any positive number.

4. **<** −47 is farther to the left than −44.

5. **>** Any positive number is greater than any negative number.

6. **D** −(−5) = 5

7. **B** The opposite of the opposite of a number is the same number.

8. **A** The vertical bars indicate absolute value.

9. **D** Absolute value is the distance from 0, which is always positive.

10. **D** Positive *x* values are to the right; negative *y* values are below the *x*-axis.

11. **C** Quadrants are named counter-clockwise, starting in the upper right. Quadrant III is to the left of the *y*-axis and below the *x*-axis.

12. **A** Reflections in the *x*-axis change the sign of the *y* value.

13. **B** Reflections in the *x*-axis change the sign of the *y* value.

14. **D** Reflections in the *y*-axis change the sign of the *x* value.

15. **C** Changing the sign of 0 does not affect its value.

16. **D** (−3, 2): 3 units left and 2 units up

17. **B** (4, −5): 4 units right, 5 units down

18. **B** −3 is a larger number than −7 and so is to its right.

19. **B** Death Valley is not as far below sea level as the Dead Sea is.

20. **D** The absolute value of a number is the distance of the number from 0.

21. **B** All statements are true, but in geometric terms, "<" means "is to the left of."

22. **D** They all have a debt equal to the absolute value of their balance.

23. **B** factors of 42: 1, 2, 3, 6, 7, 14, 21, 42
factors of 36: 1, 2, 3, 4, 6 , 9, 12, 18, 36
common factors: 1, 2, 3, 6
largest of these: 6

24. **B** multiples of 6: 6, 12, 18, 24, 30, 36, 42, 48, . . .
multiples of 9: 9, 18, 27, 36, 45, . . .
common multiples: 18, 36, . . .
smallest of these: 18

25. **B** from the friend's point of view, −85 + 5(17) = −85 + 85 = 0

26. **D** Adding a negative is a move to the left on the number line.

27. **B** Number + opposite starts at zero, goes to the number, and then returns.

28. **B** 3 − 7 = 3 + (−7) = −4

29. **D** 5 − (−6) = 5 + 6 = 11

30. **A** 7 + (−5) + (−9) = 2 + (−9) = −7

31. **C** −3 − (−8) + (−4) − 5 = −3 + 8 + (−4) + (−5) = 5 + (−4) + (−5) = 1 + (−5) = −4

32. **C** −9 + 3 + (−4) = −6 + (−4) = −10

33. **A** −8 − (−10) − 5 = −8 + 10 + (−5) = 2 + (−5) = −3

34. **C** The product of two numbers with identical signs is positive.

35. **B** 2(−4)(−1) = (−8)(−1) = 8

36. **C** The quotient of two numbers with different signs is negative.

ANSWERS AND SOLUTIONS

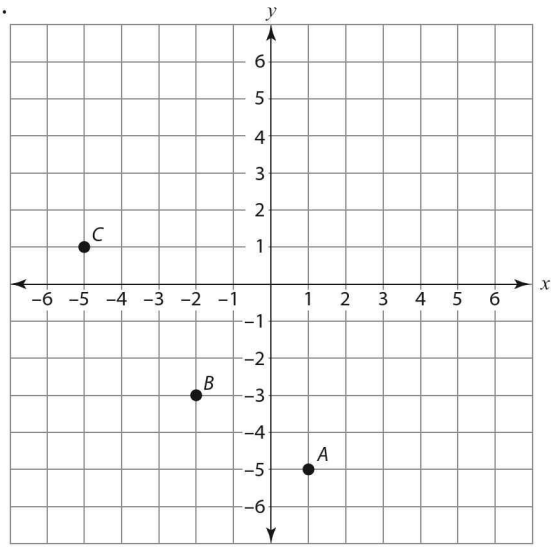
37. **A** The quotient of two numbers with different signs is negative.

38. **A** The quotient of two numbers with identical signs is positive.

39. **C** $-20 \div (-4) = 5$

40. **D** The distance between two numbers is the absolute value of their difference (as opposed to the difference of their absolute values, as in C, or any sum, as in A and B).

41.



Negative *x* values are left of the *y*-axis.
Positive *x* values are right of the *y*-axis.
Negative *y* values are below the *x*-axis.
Positive *y* values are above the *x*-axis.

42. **C** $-17 - (-52) = -17 + 52 = 35$

43. **B** Division by 0 is undefined; there is no need to compute any of the numerators.

44. **–20, –15, –8, –2, 0, 6, 13**

The negative number with largest absolute value is the smallest in the group, so it is first.

45. **D** $|-7 - 6| = |-7 + (-6)| = |-13| = 13$

Distance must be positive.

46. **0** This is the only number equal to its own opposite.

47. **C** Start at 0, follow arrow to 5, back up (negative) 8, end up at –3.

48. **A** Start at 0, go left 6, then right 2, gives the addition problem $-6 + 2$. As a subtraction problem, this would have been changed from $-6 - (-2)$, ending up at –4.

49. **B** $-40(9) = -360$; $-360 + 160 = -200$; $-200 \div 5 = -40$

50. **D** $-7(-5) - 4(-8 - 6) \div (-2) =$
$35 - 4(-8+ (-6)) \div (-2) =$
$35 - 4(-14) \div (-2) =$
$35 - (-56) \div (-2) =$
$35 - 28 = 7$

Chapter 2 Exponents, Roots, and Properties of Numbers

1. **C** The number of factors is the power.

2. **B** The power is the number of factors.

3. **A** The number of factors is the power.

4. **C** $4^3 = 4 \cdot 4 \cdot 4 = 16 \cdot 4 = 64$

5. **A** The base is the quantity to which the exponent is attached.

6. **C** $5^3 = 5 \cdot 5 \cdot 5 = 25 \cdot 5 = 125$

7. **D** $9^5 \cdot 9^3 = 9^{5+3} = 9^8$