1-4 The Distributive Property

1. **PILOT** A pilot at an air show charges $25 per passenger for rides. If 12 adults and 15 children ride in one day, write and evaluate an expression to describe the situation.

   SOLUTION:

   If she took 12 adults and 15 children for rides in one day, then she earned 25(12 + 15) dollars.

$$\begin{aligned} 25(12+15) &= 25(12)+25(15) \\ &= 300+375 \\ &= 675 \end{aligned}$$

   So, the pilot earned $675.

   Use the Distributive Property to rewrite each expression. Then evaluate.

2. 14(51)

   SOLUTION:

$$\begin{aligned} 14(51) &= 14(50+1) && \text{Rewrite 51 as } 50+1. \\ &= 14(50)+14(1) && \text{Distributive Property} \\ &= 700+14 && \text{Multiply.} \\ &= 714 && \text{Add.} \end{aligned}$$

3. $6\frac{1}{9}(9)$

   SOLUTION:

$$\begin{aligned} 6\tfrac{1}{9}(9) &= \left(6+\tfrac{1}{9}\right)9 && \text{Rewrite } 6\tfrac{1}{9} \text{ as } 6+\tfrac{1}{9}. \\ &= 6(9)+\tfrac{1}{9}(9) && \text{Distributive Property} \\ &= 54+1 && \text{Multiply.} \\ &= 55 && \text{Add.} \end{aligned}$$

   Use the Distributive Property to rewrite each expression. Then simplify.

4. 2(4 + *t*)

   SOLUTION:

$$\begin{aligned} 2(4+t) &= 2(4)+2(t) \\ &= 8+2t \end{aligned}$$

5. (*g* – 9)5

   SOLUTION:

$$\begin{aligned} (g-9)5 &= g(5)+(-9)(5) \\ &= 5g-45 \end{aligned}$$

1-4 The Distributive Property

Simplify each expression. If not possible, write *simplified*.

6. $15m + m$

SOLUTION:

$$\begin{aligned} 15m + m &= (15 + 1)m \\ &= 16m \end{aligned}$$

7. $3x^3 + 5y^3 + 14$

SOLUTION:

The expression $3x^3 + 5y^3 + 14$ is simplified because it contains no like terms or parentheses.

8. $(5m + 2m)10$

SOLUTION:

$$\begin{aligned} (5m + 2m)10 &= 10(5m) + 10(2m) \\ &= 50m + 20m \\ &= (50 + 20)m \\ &= 70m \end{aligned}$$

Write an algebraic expression for each verbal expression. Then simplify, indicating the properties used.

9. 4 times the sum of 2 times x and six

SOLUTION:

The word *times* suggest multiplication and the word *sum* suggests addition. So, the verbal expression *4 times the sum of 2 times x and six* can be represented by the algebraic expression $4(2x + 6)$.

$4(2x + 6)$
$= 4(2x) + 4(6)$ Distributive Property
$= 8x + 24$ Multiply.

10. one half of 4 times y plus the quantity of y and 3

SOLUTION:

The words *one half of* and *times* suggest multiplication and the words *plus* and *quantity of* suggest addition. So, the verbal expression *one half of 4 times y plus the quantity of y and 3* can be represented by the algebraic expression $\frac{1}{2}(4y) + (y + 3)$.

$\frac{1}{2}(4y) + (y + 3)$
$= 2y + y + 3$ Multiply.
$= 3y + 3$ Simplify.

11. **TIME MANAGEMENT** Margo uses dots to track her activities on a calendar. Red dots represent homework, yellow dots represent work, and green dots represent track practice. In a typical week, she uses 5 red dots, 3 yellow dots, and 4 green dots. How many activities does Margo do in 4 weeks?

    SOLUTION:

    To find how many activities Margo does in 4 weeks, multiply 4 times the sum of the activities she does in one week.

$$\begin{aligned} 4(5+3+4) &= 4(5)+4(3)+4(4) \\ &= 20+12+16 \\ &= 48 \end{aligned}$$

    Margo does 48 activities in 4 weeks.

12. **CCSS REASONING** The Red Cross is holding blood drives in two locations. In one day, Center 1 collected 715 pints and Center 2 collected 1035 pints. Write and evaluate an expression to estimate the total number of pints of blood donated over a 3-day period.

    SOLUTION:

    To find the total number of pints of blood donated over a 30-day period, multiply 3 times the sum of 715 and 1035.

$$\begin{aligned} 3(715+1035) &= 3(715)+3(1035) \\ &= 2145+3105 \\ &= 5250 \end{aligned}$$

    So, about 5250 pints of blood were donated over a 3-day period.

    Use the Distributive Property to rewrite each expression. Then evaluate.

13. (4 + 5)6

    SOLUTION:

$$\begin{aligned} (4+5)6 &= 4(6)+5(6) && \text{Distributive Property} \\ &= 24+30 && \text{Multiply.} \\ &= 54 && \text{Add.} \end{aligned}$$

14. 7(13 + 12)

    SOLUTION:

$$\begin{aligned} 7(13+12) &= 7(13)+7(12) && \text{Distributive Property} \\ &= 91+84 && \text{Multiply.} \\ &= 175 && \text{Add.} \end{aligned}$$

15. 6(6 – 1)

    SOLUTION:

$$\begin{aligned} 6(6-1) &= 6(6)-6(1) && \text{Distributive Property} \\ &= 36-6 && \text{Multiply.} \\ &= 30 && \text{Add.} \end{aligned}$$

16. (3 + 8)15

SOLUTION:

$$\begin{aligned}(3+8)15 &= 3(15)+8(15) && \text{Distributive Property}\\ &= 45+120 && \text{Multiply.}\\ &= 165 && \text{Add.}\end{aligned}$$

17. 14(8 – 5)

SOLUTION:

$$\begin{aligned}14(8-5) &= 14(8)-14(5) && \text{Distributive Property}\\ &= 112-70 && \text{Multiply.}\\ &= 42 && \text{Add.}\end{aligned}$$

18. (9 – 4)19

SOLUTION:

$$\begin{aligned}(9-4)19 &= 9(19)+(-4)(19) && \text{Distributive Property}\\ &= 171+(-76) && \text{Multiply.}\\ &= 95 && \text{Add.}\end{aligned}$$

19. 4(7 – 2)

SOLUTION:

$$\begin{aligned}4(7-2) &= 4(7)-4(2) && \text{Distributive Property}\\ &= 28-8 && \text{Multiply.}\\ &= 20 && \text{Add.}\end{aligned}$$

20. 7(2 + 1)

SOLUTION:

$$\begin{aligned}7(2+1) &= 7(2)+7(1) && \text{Distributive Property}\\ &= 14+7 && \text{Multiply.}\\ &= 21 && \text{Add.}\end{aligned}$$

21. 7 • 497

SOLUTION:

$$\begin{aligned}7\cdot 497 &= 7(500-3) && \text{Rewrite 497 as } 500-3.\\ &= 7(500)-7(3) && \text{Distributive Property}\\ &= 3500-21 && \text{Multiply.}\\ &= 3479 && \text{Add.}\end{aligned}$$

22. 6(525)

SOLUTION:

$$\begin{aligned} 6(525) &= 6(500+25) && \text{Rewrite } 525 \text{ as } 500+25. \\ &= 6(500)+6(25) && \text{Distributive Property} \\ &= 3000+150 && \text{Multiply.} \\ &= 3150 && \text{Add.} \end{aligned}$$

23. $36 \cdot 3\frac{1}{4}$

SOLUTION:

$$\begin{aligned} 36 \cdot 3\tfrac{1}{4} &= 36\left(3+\tfrac{1}{4}\right) && \text{Rewrite } 3\tfrac{1}{4} \text{ as } 3+\tfrac{1}{4}. \\ &= 36(3)+36\left(\tfrac{1}{4}\right) && \text{Distributive Property} \\ &= 108+9 && \text{Multiply.} \\ &= 117 && \text{Add.} \end{aligned}$$

24. $\left(4\frac{2}{7}\right)21$

SOLUTION:

$$\begin{aligned} \left(4\tfrac{2}{7}\right)21 &= \left(4+\tfrac{2}{7}\right)21 && \text{Rewrite } 4\tfrac{2}{7} \text{ as } 4+\tfrac{2}{7}. \\ &= 4(21)+\tfrac{2}{7}(21) && \text{Distributive Property} \\ &= 84+6 && \text{Multiply.} \\ &= 90 && \text{Add.} \end{aligned}$$

Use the Distributive Property to rewrite each expression. Then simplify.

25. $2(x + 4)$

SOLUTION:

$$\begin{aligned} &2(x+4) \\ &= 2(x)+2(4) && \text{Distributive Prop.} \\ &= 2x+8 && \text{Multiply.} \end{aligned}$$

26. $(5 + n)3$

SOLUTION:

$$\begin{aligned} &(5+n) \\ &= 5(3)+n(3) && \text{Distributive Prop.} \\ &= 15+3n && \text{Multiply.} \end{aligned}$$

27. $(4 - 3m)8$

SOLUTION:

$(4-3m)8$

$=4(8)+(-3m)(8)$ Distributive Property

$=32-24m$ Multiply.

28. $-3(2x - 6)$

SOLUTION:

$-3(2x-6)$

$=(-3)(2x)+(-3)(-6)$ Distributive Property

$=-6x+18$ Multiply.

Simplify each expression. If not possible, write *simplified*.

29. $13r + 5r$

SOLUTION:

$13r+5r$

$=(13+5)r$ Distributive Property

$=18r$ Substitution

30. $3x^3 - 2x^2$

SOLUTION:

The expression $3x^3 - 2x^2$ is simplified because it contains no like terms or parentheses.

31. $7m + 7 - 5m$

SOLUTION:

$7m+7-5m$

$=7m+(-5m)+7$ Commutative (+) Property

$=[7+(-5)]m+7$ Distributive Property

$=2m+7$ Substitution

32. $5z^2 + 3z + 8z^2$

SOLUTION:

$5z^2+3z+8z^2$

$=5z^2+8z^2+3z$ Commutative (+) Property

$=(5+8)z^2+3z$ Distributive Property

$=13z^2+3z$ Substitution

33. $(2 - 4n)17$

SOLUTION:

$(2-4n)17$

$=2(17)+(-4n)(17)$ Distributive Property

$=34-68n$ Multiply.

34. $11(4d + 6)$

SOLUTION:

$11(4d+6)$

$=11(4d)+11(6)$ Distributive Property

$=44d+66$ Multiply.

35. $7m + 2m + 5p + 4m$

SOLUTION:

$7m+2m+5p+4m$

$=7m+2m+4m+5p$ Commutative $(+)$ Property

$=(7+2+4)m+5p$ Distributive Property

$=13m+5p$ Substitution

36. $3x + 7(3x + 4)$

SOLUTION:

$3x+7(3x+4)$

$=3x+7(3x)+7(4)$ Distributive Property

$=3x+21x+28$ Multiply.

$=(3+21)x+28$ Distributive Property

$=24x+28$ Substitution

37. $4(fg + 3g) + 5g$

SOLUTION:

$4(fg+3g)+5g$

$=4(fg)+4(3g)+5g$ Distributive Property

$=4fg+12g+5g$ Multiply.

$=4fg+(12+5)g$ Distributive Property

$=4fg+17g$ Add.

1-4 The Distributive Property

Write an algebraic expression for each verbal expression. Then simplify, indicating the properties used.

38. the product of 5 and m squared, increased by the sum of the square of m and 5

SOLUTION:

The word *product* suggests multiplication and the words *increased by* suggest addition. To square a number means to raise it to the second power. So, the verbal expression *the product of 5 and m squared, increased by the sum of the square of m and 5* can be represented by the algebraic expression $5m^2 + (m^2 + 5)$.

$5m^2 + (m^2 + 5)$

$= \left(5m^2 + m^2\right) + 5$ Associative (+)

$= (5 + 1)m^2 + 5$ Distributive Property

$= 6m^2 + 5$ Substitution

39. 7 times the sum of a squared and b minus 4 times the sum of a squared and b

SOLUTION:

The word *times* suggests multiplication, the word *minus* suggest subtraction, and the word *sum* suggests addition. To square a number means to raise it to the second power. So, the verbal expression *7 times the sum of a squared and b minus 4 times the sum of a squared and b* can be represented by the algebraic expression $7(a^2 + b) – 4(a^2 + b)$.

$7(a^2 + b) – 4(a^2 + b)$

$= 7(a^2) + 7(b) – 4(a^2) – 4(b)$ Distributive Property

$= 7a^2 – 4a^2 + 7b – 4b$ Commutative (+)

$= (7 – 4)a^2 + (7 – 4)b$ Distributive Property

$= 3a^2 + 3b$ Substitution

40. **GEOMETRY** Find the perimeter of an isosceles triangle with side lengths of $5 + x$, $5 + x$, and xy. Write in simplest form.

SOLUTION:

To find the perimeter of the triangle, find the sum of the sides.

$P = (5+x) + (5+x) + xy$ Perimeter formula

$= xy + 5 + 5 + x + x$ Commutative (+)

$= xy + 10 + (1+1)x$ Distributive Property

$= xy + 10 + 2x$ Substitution

The perimeter is $xy + 10 + 2x$ units.

41. **GEOMETRY** A regular hexagon measures $3x + 5$ units on each side. What is the perimeter in simplest form?

SOLUTION:

A hexagon has 6 sides. In a regular hexagon, all of the sides are equal in length. To find the perimeter of a regular hexagon that measures $3x + 5$ units on each side, multiply 6 by $3x + 5$.

$$\begin{aligned} 6(3x+5) &= 6(3x)+6(5) \\ &= 18x+30 \end{aligned}$$

The hexagon has a perimeter of $18x + 30$ units.

Simplify each expression.

42. $6x + 4y + 5x$

SOLUTION:

$$\begin{aligned} &6x+4y+5x \\ &=6x+5x+4y && \text{Commutative}(+)\ \text{Property} \\ &=(6+5)x+4y && \text{Distributive Property} \\ &=11x+4y && \text{Substitution} \end{aligned}$$

43. $3m + 5g + 6g + 11m$

SOLUTION:

$$\begin{aligned} &3m+5g+6g+11m \\ &=3m+11m+5g+6g && \text{Commutative}(+)\ \text{Property} \\ &=(3+11)m+(5+6)g && \text{Distributive Property} \\ &=14m+11g && \text{Substitution} \end{aligned}$$

44. $4a + 5a^2 + 2a^2 + a^2$

SOLUTION:

$$\begin{aligned} &4a+5a^2+2a^2+a^2 \\ &=5a^2+2a^2+a^2+4a && \text{Commutative}(+)\ \text{Property} \\ &=(5+2+1)a^2+4a && \text{Distributive Property} \\ &=8a^2+4a && \text{Substitution} \end{aligned}$$

45. $5k + 3k^3 + 7k + 9k^3$

SOLUTION:

$$\begin{aligned} &5k+3k^3+7k+9k^3 \\ &=3k^3+9k^3+5k+7k && \text{Commutative}(+)\ \text{Property} \\ &=(3+9)k^3+(5+7)k && \text{Distributive Property} \\ &=12k^3+12k && \text{Substitution} \end{aligned}$$

1-4 The Distributive Property

46. $6d + 4(3d + 5)$

SOLUTION:

$$
\begin{aligned}
&6d+4(3d+5)\\
&=6d+4(3d)+4(5) && \text{Distributive Property}\\
&=6d+12d+20 && \text{Commutative (+) Property}\\
&=(6+12)d+20 && \text{Distributive Property}\\
&=18d+20 && \text{Substitution}
\end{aligned}
$$

47. $2(6x + 4) + 7x$

SOLUTION:

$$
\begin{aligned}
&2(6x+4)+7x\\
&=2(6x)+2(4)+7x && \text{Substitution}\\
&=12x+8+7x && \text{Commutative (+) Property}\\
&=12x+7x+8 && \text{Distributive Property}\\
&=(12+7)x+8 && \text{Distributive Property}\\
&=19x+8 && \text{Substitution}
\end{aligned}
$$

48. **FOOD** Kenji is picking up take-out food for his study group.

Menu	
Item	**Cost ($)**
sandwich	2.49
cup of soup	1.29
side salad	0.99
drink	1.49

a. Interpret the expression 4(2.49) + 3(1.29) + 3(0.99) + 5(1.49)

b. How much would it cost if Kenji bought four of each item on the menu?

SOLUTION:

a. the cost of four sandwiches, three soups, three salads, and five drinks

b. To find how much it cost if Kenji bought four of each item on the menu, multiply 4 times the sum of the cost of one of each item.

$$
\begin{aligned}
4(2.49+1.29+0.99+1.49) &= 4(6.26)\\
&= 25.04
\end{aligned}
$$

It would cost Kenji $25.04 if he bought four of each item on the menu.

1-4 The Distributive Property

Use the Distributive Property to rewrite each expression. Then simplify.

49. $\left(\frac{1}{3}-2b\right)27$

SOLUTION:

$\left(\frac{1}{3}-2b\right)27$

$=\frac{1}{3}(27)+(-2b)(27)$ Distributive Property

$=9-54b$ Multiply.

50. $4(8p+4q-7r)$

SOLUTION:

$4(8p+4q-7r)$

$=4(8p)+4(4q)+4(-7r)$ Distributive Property

$=32p+16q-28r$ Substitution

51. $6(2c-cd^2+d)$

SOLUTION:

$6\left(2c-cd^2+d\right)$

$=6(2c)+6\left(-cd^2\right)+6(d)$ Distributive Property

$=12c-6cd^2+6d$ Substitution

Simplify each expression. If not possible, write *simplified*.

52. $6x^2+14x-9x$

SOLUTION:

$6x^2+14x-9x=6x^2+(14-9)x$

$=6x^2+5x$

53. $4y^3+3y^3+y^4$

SOLUTION:

$4y^3+3y^3+y^4=(4+3)y^3+y^4$

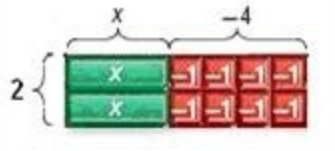
$=7y^3+y^4$

54. $a + \frac{a}{5} + \frac{2}{5}a$

SOLUTION:

$$a+\frac{a}{5}+\frac{2}{5}a=\left(1+\frac{1}{5}+\frac{2}{5}\right)a$$
$$=\left(\frac{5}{5}+\frac{1}{5}+\frac{2}{5}\right)a$$
$$=\frac{8}{5}a$$

55. **MULTIPLE REPRESENTATIONS** The area of the model is $2(x - 4)$ or $2x - 8$. The expression $2(x - 4)$ is in *factored form*.



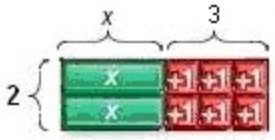
a. GEOMETRIC Use algebra tiles to form a rectangle with area $2x + 6$. Use the result to write $2x + 6$ in factored form.

b. TABULAR Use algebra tiles to form rectangles to represent each area in the table. Record the factored form of each expression.

Area	Factored Form
$2x + 6$	
$3x + 3$	
$3x - 12$	
$5x + 10$	

c. VERBAL Explain how you could find the factored form of an expression.

SOLUTION:

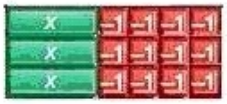


a.

The area of the rectangle is $x + 3 + x + 3 = 2x + 6$ and $2x + 6 = 2(x + 3)$.

b.

Area	Algebra Tiles	Factored Form

$2x+6$		$2(x+3)$
$3x+3$		$3(x+1)$
$3x-12$		$3(x-4)$
$5x+10$		$5(x+2)$

c. Divide each term of the expression by the same number. Then write the expression as a product.

56. **CCSS PERSEVERANCE** Use the Distributive Property to simplify $6x^2[(3x - 4) + (4x + 2)]$.

SOLUTION:

$6x^2[(3x-4)+(4x+2)]$

$=6x^2[3x+4x+(-4)+2]$ Commutative (+) Property

$=6x^2[(3+4)x+(-2)]$ Distributive Property

$=6x^2[7x+(-2)]$ Substitution

$=6x^2(7x)+6x^2(-2)$ Distributive Property

$=42x^3-12x^2$ Multiply.

57. **REASONING** Should the Distributive Property be a property of multiplication, addition, or both? Explain your answer.

SOLUTION:

The Distributive Property should be considered a property of both. Both operations are used in $a(b + c) = ab + ac$.

58. **WRITING IN MATH** Why is it helpful to represent verbal expressions algebraically?

SOLUTION:

Algebraic expressions are helpful because they are easier to interpret and apply than verbal expressions. They can also be rewritten in a more simplified or manageable form.

Consider the example: Sara purchased 3 post cards at $1.50 and 2 key chains at $3.00.
3(1.50) + 2(3.00) = $10.50
If the prices are doubled, it is easier to calculate the value if the verbal expression is written as an algebraic expression.
3(1.50 • 2) + 2(3.00 • 2) = 3(3.00) + 2(6.00) = 21

59. **WRITING IN MATH** Use the data about skating below to explain how the Distributive Property can be used to calculate quickly. Also, compare the two methods of finding the total Calories burned.

SOLUTION:

John burns approximately 420 Calories per hour by inline skating. The chart below shows the time he spent inline skating in one week.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Time (h)	1	$\frac{1}{2}$	0	1	0	2	$2\frac{1}{2}$

Method 1 Rate Times Total Time

$$420\left(1+\frac{1}{2}+1+2+2\frac{1}{2}\right)$$
$$=420(7)$$
$$=2940$$

Method 2 Sum of Daily Calories Burned

$$420(1)+420\left(\frac{1}{2}\right)+420(1)+420(2)+420\left(2\frac{1}{2}\right)$$
$$=420+210+420+840+1050$$
$$=5940$$

60. Which illustrates the Symmetric Property of Equality?

A If $a = b$, then $b = a$.

B If $a = b$, and $b = c$, then $a = c$.

C If $a = b$, then $b = c$.

D If $a = a$, then $a + 0 = a$.

SOLUTION:

Choice D sort of relates to the Additive Identity, but in fact does not illustrate any property. Choice B illustrates the Transitive Property. Choice C does not illustrate any properties. The Symmetric Property states that if the first part equals the second part, then the second part must equal the first part. This is illustrated by Choice A.

So, Choice A is the correct answer.

61. Anna is three years younger than her sister Emily. Which expression represents Anna's age if we express Emily's age as y years?

F $y + 3$

G $y - 3$

H $3y$

J $\frac{3}{y}$

SOLUTION:

If Anna is 3 years younger than Emily, and Emily is y years old, then Anna is $y - 3$ years old. Choice G is the correct answer.

62. Which property is used below?

If $4xy^2 = 8y^2$ and $8y^2 = 72$, then $4xy^2 = 72$.

A Reflexive Property

B Substitution Property

C Symmetric Property

D Transitive Property

SOLUTION:

The Transitive Property says that if $a = b$ and $b = c$, then $a = c$. So, "If $4xy^2 = 8y^2$ and $8y^2 = 72$, then $4xy^2 = 72$," shows the Transitive Property. Replace a with $4xy^2$, b with $8y^2$, and c with 72. Choice D is the correct answer.

63. **SHORT RESPONSE** A drawer contains the socks in the chart. What is the probability that a randomly chosen sock is blue?

Color	Number
white	16
blue	12
black	8

SOLUTION:

$$\text{probability} = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

The number of possible outcomes is 16 + 12 + 8 or 36.

So, $P(\text{blue}) = \frac{12}{36} = \frac{1}{3}$ or about 33.3%.

Evaluate each expression. Name the property used in each step.

64. 14 + 23 + 8 + 15

SOLUTION:

14 + 23 + 8 + 15	
= (14 + 23) + (8 + 15)	Associative (+)
= 37 + 23	Substitution
= 60	Substitution

65. 0.24 • 8 • 7.05

SOLUTION:

0.24 • 8 • 7.05

= (0.24 • 8) • 7.05 Associative (×)

= 1.92 • 7.05 Substitution

= 13.536 Substitution

66. $1\frac{1}{4} \cdot 9 \cdot \frac{5}{6}$

SOLUTION:

$1\frac{1}{4} \cdot 9 \cdot \frac{5}{6}$

$= \left(1\frac{1}{4} \cdot 9\right)\frac{5}{6}$ Associative (×)

$= 11\frac{1}{4} \cdot \frac{5}{6}$ Substitution

$= 9\frac{3}{8}$ Substitution

67. **SPORTS** Braden runs 6 times a week for 30 minutes and lifts weights 3 times a week for 20 minutes. Write and evaluate an expression for number of hours Braden works out in 4 weeks.

SOLUTION:

To find the number of hours Braden works out in 4 weeks, multiply the number of minutes he works out divided by 60 by 4.

$$\frac{4\left[6(30)+3(20)\right]}{60} = \frac{4(180+60)}{60}$$
$$= \frac{4(240)}{60}$$
$$= \frac{960}{60}$$
$$= 16$$

So, Braden works out 16 hours in 4 weeks.

SPORTS Refer to the table showing Blanca's cross-country times for the first 8 meets of the season. Round answers to the nearest second

Cross Country	
Meet	Time
1	22:31
2	22:21
3	21:48
4	22:01
5	21:48
6	20:56
7	20:34
8	20:15

68. Find the mean of the data.

SOLUTION:

The times are given in minutes and seconds. Rewrite the times so that they are in seconds by multiplying the number of minutes by 60 and then adding the seconds.

Time in Minutes:Seconds	Time in Seconds
22:31	1351
22:21	1341
21:48	1308
22:01	1321
21:48	1308
20:56	1256
20:34	1236
20:15	1215

To find the mean, find the sum of the times and divide by 8.

$1351 + 1341 + 1308 + 1321 + 1308 + 1256 + 1236 + 1215 = 10{,}336$

$10{,}336 \div 8 = 1292$

The mean is 1292 seconds or 21:32.

69. Find the median of the data.

SOLUTION:

To find the median, order the data from least to greatest. The data in order from least to greatest are {20:15, 20:34, 20:56, 21:48, 21:48, 22:01, 22:21, 22:31}. The times are given in minutes and seconds. Rewrite the times so that they are in seconds by multiplying the number of minutes by 60 and then adding the seconds.

Time in Minutes:Seconds	Time in Seconds
20:15	1215
20:34	1236
20:56	1256
21:48	1308
21:48	1308
22:01	1321
22:21	1341
22:31	1351

The median is in the middle. There are two numbers in the middle, 1308 and 1308, so the median is the average of those numbers.

$$\frac{1308+1308}{2} = \frac{2616}{2}$$
$$= 1308$$

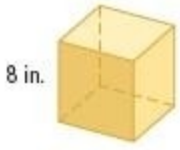
So, the median is 1308 seconds or 21:48.

70. Find the mode of the data.

SOLUTION:

The mode is the number or numbers that appear most often in a set of data. The time 21:48 appears most often, so the mode is 21:48.

71. **SURFACE AREA** What is the surface area of the cube?



SOLUTION:

To find the surface area of the cube, multiply the area of one face by 6.

$$SA = 6\ell w$$
$$= 6(8)(8)$$
$$= 384$$

So, the surface area is 384 square inches.

1-4 The Distributive Property

Evaluate each expression.

72. 12(7 + 2)

SOLUTION:

$$\begin{aligned} 12(7+2) &= 12(7)+12(2) \\ &= 84+24 \\ &= 108 \end{aligned}$$

73. 11(5) – 8(5)

SOLUTION:

$$\begin{aligned} 11(5)-8(5) &= 55-40 \\ &= 15 \end{aligned}$$

74. (13 – 9) • 4

SOLUTION:

$$\begin{aligned} (13-9)\cdot 4 &= 4\cdot 4 \\ &= 16 \end{aligned}$$

75. 3(6) + 7(6)

SOLUTION:

$$\begin{aligned} 3(6)+7(6) &= (3+7)6 \\ &= 10(6) \\ &= 60 \end{aligned}$$

76. (1 + 19) • 8

SOLUTION:

$$\begin{aligned} (1+19)\cdot 8 &= 20\cdot 8 \\ &= 160 \end{aligned}$$

77. 16(5 + 7)

SOLUTION:

$$\begin{aligned} 16(5+7) &= 16(5)+16(7) \\ &= 80+112 \\ &= 192 \end{aligned}$$