

109.
$$\boxed{\text{Total area}} = 2 \cdot \boxed{\text{Area of trapezoid}} + 2 \cdot \boxed{\text{Area of triangle}}$$

$$\text{Area} = \left[\frac{1}{2} \cdot h(b_1 + b_2) \right] + 2 \left[\frac{1}{2} \cdot b \cdot h \right]$$

$$\begin{aligned} \text{Area} &= 12(60 + 40) + 20 \cdot 12 \\ &= 12(100) + 240 \\ &= 1200 + 240 \\ &= 1440 \text{ square feet} \end{aligned}$$

111. (d) $(0 + 3 + 1 + 2 + 6 + 7)3 + (4 + 8 + 9 + 3 + a)$

(e) $81 + a$, the next-highest multiple of 10 will be 90.

$$90 - (81 + a) = 4 \qquad 9 - a = 4 \qquad a = 5$$

$$90 - 81 - a = 4 \qquad -a = -5 \qquad \text{No. The work shows the only possible answer.}$$

113. To combine like terms add (or subtract) their respective coefficients and attach the common variable factor.

Example: $5x^4 - 3x^4 = (5 - 3)x^4 = 2x^4$

115. The Distributive Property is used to simplify $5x + 3x$ as follows: $5x + 3x = (5 + 3)x = 8x$.

117. It is not possible to evaluate $\frac{x+2}{y-3}$ when $x = 5$ and $y = 3$ because $\frac{7}{0}$ is undefined.

Section P.5 Constructing Algebraic Expressions

1. The sum of 8 and a number n is translated into the algebraic expression $8 + n$.

3. The sum of 12 and twice a number n is translated into the algebraic expression $12 + 2n$.

5. Six less than a number n is translated into the algebraic expression $n - 6$.

7. Four times a number n minus 3 is translated into the algebraic expression $4n - 3$.

9. One-third of a number n is translated into the algebraic expression $\frac{1}{3}n$.

11. The quotient of a number x and 6 is translated into the algebraic expression $\frac{x}{6}$.

13. Eight times the ratio of N and 5 is translated into the algebraic expression $8 \cdot \frac{N}{5}$.

15. The number c is quadrupled and the product is increased by 10 is translated into the algebraic expression $4c + 10$.

17. Thirty percent of the list price L is translated into the algebraic expression $0.30L$.

19. The sum of a number and 5 divided by 10 is translated into the algebraic expression $\frac{n+5}{10}$.

21. The absolute value of the difference between a number and 5 is translated into the algebraic expression $|n - 5|$.

23. The product of three and the square of a number decreased by 4 is translated into the algebraic expression $3x^2 - 4$.

25. A verbal description of $t - 2$ is a number decreased by 2.
27. A verbal description of $y + 50$ is the sum of a number and 50.
29. A verbal description of $3x + 2$ is the sum of three times a number and two.
31. A verbal description of $\frac{z}{2}$ is the ratio of a number to two.
33. A verbal description of $\frac{4}{5}x$ is four-fifths of a number.
35. A verbal description of $8(x - 5)$ is eight times the difference of a number and five.
37. A verbal description of $\frac{x + 10}{3}$ is the sum of a number and ten, divided by three.
39. A verbal description of $x(x + 7)$ is some number times the sum of the same number and seven.
41. *Verbal Description:* The amount of money (in dollars) represented by n quarters
Label: $n =$ number of quarters
Algebraic Description: $0.25n =$ amount of money (in dollars)
43. *Verbal Description:* The amount of money (in dollars) represented by m dimes
Label: $m =$ number of dimes
Algebraic Description: $\frac{m}{10}$
45. *Verbal Description:* The amount of money (in cents) represented by m nickels and n dimes
Label: $m =$ number of nickels
 $n =$ number of dimes
Algebraic Description: $5m + 10n$
47. *Verbal Description:* The distance traveled in t hours at an average speed of 55 miles per hour
Label: $t =$ number of hours
Algebraic Description: $55t$
49. *Verbal Description:* The time to travel 100 miles at an average speed of r miles per hour
Label: $r =$ average speed
Algebraic Description: $\frac{100}{r}$
51. *Verbal Description:* The amount of antifreeze in a cooling system containing y gallons of coolant that is 45% antifreeze
Label: $y =$ number of gallons
Algebraic Description: $0.45y$
53. *Verbal Description:* The amount of wage tax due for a taxable income of I dollars that is taxed at the rate of 1.25%
Label: $I =$ number of dollars
Algebraic Description: $0.0125I$

- 55. Verbal Description:** The sale price of a coat that has a list price of L dollars if the sale is a “20% off” sale
Label: $L =$ number of dollars
Algebraic Description: $0.80L$
- 57. Verbal Description:** The total hourly wage for an employee when the base pay is \$8.25 per hour plus 60 cents for each of q units produced per hour
Label: $q =$ number of units produced
Algebraic Description: $8.25 + 0.60q$
- 59. Verbal Description:** The sum of a number n and three times the number
Label: $n =$ the number
 $3n =$ three times the number
Algebraic Description: $n + 3n = 4n$
- 61. Verbal Description:** The sum of two consecutive odd integers, the first of which is $2n + 1$.
Labels: $2n + 1 =$ first odd integer
 $2n + 3 =$ second odd integer
Algebraic Description: $(2n + 1) + (2n + 3) = 4n + 4$
- 63. Verbal Description:** The product of two consecutive even integers, divided by 4
Labels: $2n =$ first even integer
 $2n + 2 =$ second even integer
Algebraic Description: $\frac{2n(2n + 2)}{4} = \frac{4n(n + 1)}{4}$
 $= n(n + 1)$
- 65.** Area = side \cdot side
 $= s \cdot s$
 $= s^2$
- 67.** Area = $\frac{1}{2}$ (base)(height)
 $= \frac{1}{2}(b)(0.75b)$
 $= 0.375b^2$
- 69.** Perimeter = $2(2w) + 2(w) = 4w + 2w = 6w$
Area = $2w \cdot w = 2w^2$
- 71.** Perimeter = $3 + 2x + 6 + x + 3 + x = 4x + 12$
Area = $(x \cdot 3) + (3 \cdot 2x) = 3x + 6x = 9x$
- 73.** $l \cdot (l - 6) =$ area of billiard table
The unit of measure for the area is feet² or square feet.
- 75.**
- | | | | | | | |
|-------------|----|---|---|----|----|----|
| n | 0 | 1 | 2 | 3 | 4 | 5 |
| $5n - 3$ | -3 | 2 | 7 | 12 | 17 | 22 |
| Differences | 5 | 5 | 5 | 5 | 5 | |
- 77.** The third row difference for the algebraic expression $an + b$ would be a .
- 79.** The phrase reduced by implies subtraction.
- 81.** $4x$ is the equivalent to (a) x multiplied by 4 and (c) the product of x and 4.
- 83.** Using a specific case may make it easier to see the form of the expression for the general case.