VOCABULARY EXERCISES

In Exercises 1–3, copy and complete the statement.

1. In the power $7^{12}$, $7$ is the base and $12$ is the exponent.

2. A(n) $\Delta$ is a statement that contains the symbol $\Rightarrow$.

3. A(n) $\Delta$ is an expression that includes at least one variable.

4. WRITING Describe how you can tell by looking at the graph of a function which variable is the input variable and which is the output variable.

Evaluate Expressions

Evaluate the expression.

5. $3 + x$ when $x = 13$  
6. $y - 2$ when $y = 18$  
7. $\frac{20}{k}$ when $k = 2$  
8. $40w$ when $w = 0.5$  
9. $z^2$ when $z = 20$  
10. $w^3$ when $w = 0.1$

11. DVD STORAGE A DVD storage sleeve has the shape of a square with an edge length of 5 inches. What is the area of the front of the sleeve?

12. NOTEPAPER You store square notepaper in a cube-shaped box with an inside edge length of 3 inches. What is the volume of the box?

Apply Order of Operations

Evaluate the expression.

13. $12 - 6 \div 2 = \boxed{9}$
14. $1 + 2 \cdot 9^2 = \boxed{1+2(81)} = \boxed{163}$
15. $3 + 2^3 - 6 + 2 = \boxed{3+8-3} = \boxed{8}$
16. $15 - (4 + 3^2) = \boxed{2}$
17. $\frac{20 - 12}{5^2 - 1} = \frac{8}{24} = \boxed{\frac{1}{3}}$
18. $50 - (7 + 3^2) = \boxed{50-11.5} = \boxed{38.5}$

Evaluate the expression when $x = 4$.

19. $15x - 8 = \boxed{52}$
20. $3x^2 + 4 = \boxed{52}$
21. $2(x-1)^2 = \boxed{18}$
1.3 Write Expressions

22. The sum of a number \( k \) and 7 \( k + 7 \)
24. The quotient of a number \( k \) and 12 \( \frac{k}{12} \) or \( k \div 12 \)

26. **TOLL ROADS** A toll road charges trucks a toll of $3 per axle. Write an expression for the total toll for a truck.

\[ \text{Kt: } $3/\text{axle} \]

\[ \text{Variable: A = number of axles} \]

27. **SCHOOL SUPPLIES** You purchase some notebooks for $2.95 each and a package of pens for $2.19. Write an expression for the total amount (in dollars) that you spend.

\[ \text{Kc: } 2.95 - \text{Notebook} \]
\[ 2.19 - \text{Pens} \]

23. 5 less than a number \( z \) \( z - 5 \)
25. 3 times the square of a number \( x \) \( 3x^2 \) or \( 3x^2 \)

1.4 Write Equations and Inequalities

Write an equation or an inequality.

28. The product of a number \( z \) and 12 is 60.
29. The sum of 13 and a number \( t \) is at least 24.

Check whether the given number is a solution of the equation or inequality.

30. \( 3x - 4 = 10 \) \( x = 5 \)
31. \( 4y - 2 \geq 2 \) \( y \geq 1 \)
32. \( 2d + 4 < 9d - 7 \) \( d < 5 \)

1.5 Use a Problem Solving Plan

33. **U.S. HISTORY** The flag that inspired the national anthem was a rectangle 30 feet wide and 42 feet long. Pieces of the flag have been lost. It is now 30 feet wide and 34 feet long. How many square feet have been lost?

\[ \text{Lost: } 30 \times 8 = 240 \]

34. **PATTERNS** A grocery clerk stacks three rows of cans of fruit for a display. Each of the top two rows has 2 fewer cans than the row beneath it. There are 30 cans altogether. How many cans are there in each row?

\[ \text{Bottom Row: } 12 \text{ cans} \]
\[ \text{Row 1: } x - 4 \]
\[ \text{Row 2: } x - 2 \]
\[ \text{Row 3: } x = 12 \]
Make a table for the function. Identify the range of the function.

35. \( y = x - 5 \)
   - Domain: 10, 12, 15, 20, 21
     - Range: 5, 7, 10, 15, 16
   
   \[
   \begin{array}{c|cccc}
   x & 10 & 12 & 15 & 20 & 21 \\
   y & 5 & 7 & 10 & 15 & 16 \\
   \end{array}
   \]

36. \( y = 3x + 1 \)
   - Domain: 0, 2, 3, 5, 10
     - Range: 1, 7, 10, 16, 31
   
   \[
   \begin{array}{c|cccc}
   x & 0 & 2 & 3 & 5 & 10 \\
   y & 1 & 7 & 10 & 16 & 31 \\
   \end{array}
   \]

Write a rule for the function.

37. 
   - Input, \( x \): 0, 2, 4, 5
   - Output, \( y \): 4, 6, 8, 9
     \[ y = x + 4 \]

38. 
   - Input, \( x \): 0, 3, 4, 6
   - Output, \( y \): 0, 15, 20, 30
     \[ y = 5x \]

1.7 Represent Functions as Graphs

39. Graph the function \( y = 4x - 3 \) with domain 1, 2, 3, 4, and 5.

   \[
   \begin{array}{c|cccc}
   x & 1 & 2 & 3 & 4 & 5 \\
   y & 1 & 5 & 9 & 13 & 17 \\
   \end{array}
   \]

40. Write a rule for the function represented by the graph. Identify the domain and the range of the function.

   \[
   \begin{array}{c|cccc}
   x & 1 & 3 & 5 & 7 \\
   y & 1 & 2 & 3 & 4 \\
   \end{array}
   \]

   \[ y = \frac{1}{2}x + \frac{1}{2} \]

   Domain = 1, 3, 5, 7
   Range = 1, 2, 3, 4

   Mental check:
   \[ \frac{1}{2}(1) + \frac{1}{2} = 1 \]
   \[ \frac{1}{2}(3) + \frac{1}{2} = 2 \]
   \[ \frac{1}{2}(5) + \frac{1}{2} = 3 \]
   \[ \frac{1}{2}(7) + \frac{1}{2} = 4 \]
11. DVD Square: 
\[
\text{Area} = 5 \times 5 = 25 \text{ in}^2
\]

12. Cubed box: 
\[
\text{Volume} = l \times w \times h = 3 \times 3 \times 3 = 27 \text{ in}^3
\]

33. Total flag: 
\[
42 \times 30 = 1260 \text{ ft}^2
\]
Flag remaining: 
\[
34 \times 30 = 1020 \text{ ft}^2
\]
240 ft\(^2\) lost

34. Total of 30 cans: 
\[
x + (x+2) + (x+4) = 30
\]
\[
3x + 6 = 30
\]
\[
x = 24
\]
The rows have 8 cans, 10 cans, 12 cans.