

## 1–5 Translating Sentences into Equations

**Objective:** To translate word sentences into equations.

**Example 1** Twice the sum of a number and 3 is twelve.

**Translation**  $2 \cdot (n + 3) = 12$

**Example 2** The sum of one half of the number  $x$  and 10 is 24.

**Translation**  $\frac{1}{2}x + 10 = 24$

Match the sentence in the first column with the corresponding equation in the second column.

- |   |                   |
|---|-------------------|
| 1. Three more than twice a number is nine.                    | a. $2 - 3x = 9$   |
| 2. Two less than three times a number is nine.                | b. $3(x - 2) = 9$ |
| 3. Three times the number which is two less than $x$ is nine. | c. $2x + 3 = 9$   |
| 4. Two times the number which is three less than $x$ is nine. | d. $2(x + 3) = 9$ |
| 5. Two times the quantity three more than $x$ is nine.        | e. $3(2 - x) = 9$ |
| 6. Three less than the product of two and $x$ is nine.        | f. $2(x - 3) = 9$ |
| 7. Two decreased by three times a number is nine.             | g. $2x - 3 = 9$   |
| 8. Three times the quantity two decreased by $x$ is nine.     | h. $3x - 2 = 9$   |

Translate each sentence into an equation.

- |   |   |
|---|---|
| 9. One half of a number is four.                          | 10. Three more than a number is eight.                      |
| 11. Six less than a number is nine.                       | 12. Two less than three times a number is eleven.           |
| 13. Twice a number is 12 more than five times the number. | 14. The number $x$ is seven more than one fourth of itself. |
| 15. Five less than twice a number is 15.                  | 16. Two times the quantity $x$ minus 1 is 12.               |
| 17. Eleven more than twice $x$ is five less than $x$ .    | 18. Nine times $x$ is twice the sum of $x$ and five.        |

### Vocabulary

**Formulas** Equations that state rules about relationships. Examples:

$A = lw$  Area of rectangle = length of rectangle  $\times$  width of rectangle

$P = 2l + 2w$  Perimeter of rectangle =  $(2 \times \text{length}) + (2 \times \text{width})$

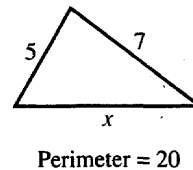
$D = rt$  Distance traveled = rate  $\times$  time traveled

$C = np$  Cost = number of items  $\times$  price per item

**1-5 Translating Sentences into Equations** (continued)

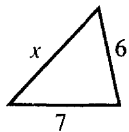
**Example 3** Use the figure and the information below it to write an equation involving  $x$ .

**Solution** Perimeter = the sum of the lengths of the sides.  
 $20 = 5 + 7 + x$   
 $20 = 12 + x$



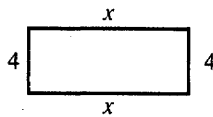
Use the figure and the information below to write an equation involving  $x$ .

19.



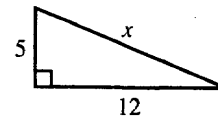
Perimeter = 21

20.



Perimeter = 28

21.



Perimeter = 30

**Example 4** a. Choose a variable to represent the number described in parentheses.  
 b. Write an equation that represents the given information.

The distance traveled in 4 h of driving was 260 km. (Hourly rate)

**Solution 1** a. Let  $r$  = the hourly rate  
 b. Rate  $\times$  time = distance  
 $r \cdot 4 = 260$ ,  
 or  $4r = 260$ .

**Solution 2** a. Let  $r$  = the hourly rate  
 b. Since the hourly rate is the number of km traveled in one hour,  $r = \frac{260}{4}$ .

In Exercises 22–24,

a. Choose a variable to represent the number described in parentheses.  
 b. Write an equation that represents the given information.

22. The distance traveled in 3 h of driving was 210 km. (Hourly rate)

23. A train traveled at 66 km/h for 4 h. (Distance traveled)

24. A driver averaged 60 km/h while driving 300 km. (Time)

**Mixed Review Exercises**

Solve if  $x \in \{0, 1, 2, 3, 4, 5, 6\}$ .

1.  $3 + x = 8$

2.  $4 = x - 2$

3.  $4x = 20$

4.  $2 = x \div 3$

5.  $2x + 1 = 7$

6.  $3x = x + 4$

7.  $x + 3 = 2x$

8.  $2x = x \cdot 2$

Translate each phrase into a variable expression.

9. A number increased by 6

10. The quotient of  $x$  and 2

11. The product of 9 and a number

12. Twice the sum of a number and 3