

Lesson 3-6

Example 1 Translate Sentences into Equations

Translate each sentence into an equation.

Sentence	Equation
a. Three less than twice a number is -12 .	$2n - 3 = -12$
b. Thirty is six times a number increased by seven	$30 = 6n + 7$
c. The quotient of a number and four, decreased by two, is five.	$\frac{n}{4} - 2 = 5$

Example 2 Translate and Solve an Equation

Twenty four is six more than three times a number. Find the number.

Words Twenty four is six more than three times a number.

Variables Let n = the number.

Equation	$24 = 3n + 6$	Write the equation.
	$24 - 6 = 3n + 6 - 6$	Subtract 6 from each side.
	$18 = 3n$	Simplify.
	$6 = n$	Mentally divide each side by 3.

Therefore, the number is 6.

Example 3 **Write and Solve a Two-Step Equation**

READING Suppose your goal is to read 50 books in a summer reading program. You have already read 26 books and plan to reach your goal by reading 3 books each week for the remaining weeks of the program. How many weeks are left in the program?

Explore You have already read 26 books. You plan to read 3 books each week until you have read a total of 50 books.

Plan Organize the data for the first few weeks in a table. Notice the pattern.

Week	Total Books
0	$3(0) + 26 = 26$
1	$3(1) + 26 = 29$
2	$3(2) + 26 = 32$
3	$3(3) + 26 = 35$

Write an equation to represent the situation.

Let x = the number of weeks.

$$\begin{array}{ccccccc}
 3 \text{ books each week} & & \text{plus} & & \text{books already} & \text{equals} & 50 \text{ books.} \\
 \text{for } x \text{ weeks} & & & & \text{read} & & \\
 \\
 3x & & + & & 26 & = & 50
 \end{array}$$

Solve

$$3x + 26 = 50$$

$$3x + 26 - 26 = 50 - 26$$

$$3x = 24$$

$$x = 8$$

Write the equation.

Subtract 26 from each side.

Simplify.

Mentally divide each side by 3.

There are 8 weeks left in the summer reading program.

Examine

If you read 3 books each week you will have read an additional 24 books. If you combine this 24 with the 26 already read, the total will be 50 books. The answer appears to be reasonable.

Example 4 **Write and Solve a Two-Step Equation**

CARPENTRY **Nicholas has a board which measures 40 inches in length. He cuts the board into two pieces, one of which is 8 inches shorter than the other. Find the length of both pieces.**

Words The total length of the board is 40 inches.

Variables Let x = length of the longer piece.
Let $x - 8$ = length of the shorter piece.

Equation	$x + (x - 8) = 40$	Write the equation.
	$(x + x) - 8 = 40$	Associative Property
	$2x - 8 = 40$	Combine like terms.
	$2x - 8 + 8 = 40 + 8$	Add 8 to each side.
	$2x = 48$	Simplify.
	$\frac{2x}{2} = \frac{48}{2}$	Divide each side by 2.
	$x = 24$	Simplify.

Since x represents the length of the longer piece, the longer piece measures 24 inches. The shorter piece measures $24 - 8$ or 16 inches.