

LESSON
15

Solving Problems with Equations

Review It!

When you solve word problems, look for key words.

Alice sold 3 more than 2 times the number of magazines that Josh sold. Alice sold a total of 27 magazines. How many magazines did Josh sell?

Step 1 Choose a variable.

$j =$ _____

THINK Use a variable that helps you remember that you want Josh's number.

Step 2 Look for key words.

"3 more than" means _____ 3.

"2 times" means _____ by 2.

Step 3 Write an equation.

_____ j + _____ = _____

Step 4 Solve the equation.

$$2j + 3 = 27$$

$$2j + 3 - 3 = 27 - \underline{\quad}$$

$$2j = \underline{\quad}$$

$$2j = \underline{\quad}$$

$$\frac{2j}{2} = \frac{\square}{2}$$

$$j = \underline{\quad}$$

REMEMBER Subtract the same number from both sides.

REMEMBER $2j$ means $2 \times j$.

So, Josh sold _____ magazines.

Try It!

Solve each equation.

1. $2x + 3 = 7$

$$x = 2$$

2. $3x - 1 = 11$

$$x = 4$$

3. $\frac{x}{2} + 3 = 6$

$$x = 6$$

Ask Yourself

1.

What should you do first?
subtract, or divide?

Write an equation for the situation.

4. Harold read 5 more than twice the number of pages that

Nancy read. Harold read 35 pages.

$$2n + 5 = 35$$

2.

What should you do first?
add, or divide?

5. Gregg multiplied a number (n) by 5, subtracted 6 from the

product, and got 29.

$$5n - 6 = 29$$

Write an equation. Solve the equation. Then answer the question.

6. In October, Paul ran 3 miles more than 4 times the number of miles he ran in September. He ran 35 miles in October. How many miles did he run in September?

$$4s + 3 = 35; s = 8$$

4.

What does "twice" mean?
 $\times 2$, or $+2$?

7. Oscar has 8 more than 6 times the number of books that Kyle has. If Oscar has 80 books, how many books does Kyle have?

$$6k + 8 = 80; k = 12$$

6.

When did Paul run more?
September, or October?

8. Jennifer's age, j , is 3 years less than 2 times Paul's age, p . If Jennifer is 13 years old, how old is Paul?

$$2p - 3 = 13; p = 8$$

On Your Own!

Circle the best answer for each question.

1. The number of girls in a school is 57 less than 2 times the number of boys in the school. There are 143 girls in the school. How many boys are in the school?
- A. 43 $2b - 57 = 143$
 B. 68 $2b = 200$
 C. 86 $b = 100$
 D. 100
2. A bag contains green marbles and blue marbles. The number of blue marbles is 2 less than 5 times the number of green marbles. If there are 153 blue marbles in the bag, how many green marbles are in the bag?
- A. 31 $5g - 2 = 153$
 B. 30 $5g = 155$
 C. 25 $g = 31$
 D. 20
3. Tony bought a pair of shoes that cost \$116. His shoes cost \$46 less than twice the price that Joe paid. What did Joe's shoes cost?
- A. \$40 $2j - 46 = 116$
 B. \$81 $2j = 162$
 C. \$86 $j = 81$
 D. \$160

4. Letty bought a computer for \$933.79, including taxes. Ron bought a graphing calculator. Letty's computer cost \$6.85 more than 7 times the cost of Ron's calculator. How much did Ron's calculator cost?
- A. \$132.32
 B. \$132.42 $7r + 6.85 = 933.79$
 C. \$134.38 $7r = 926.94$
 D. \$134.42 $r = 132.42$
5. Arthur earns \$9.50 per hour. He needs \$200 to pay for a field trip. He has already saved \$57.50. How many hours more will he have to work to have \$200 for the trip?
- A. 12 $9.5t + 57.50 = 200$
 B. 14
 C. 15 $9.5t = 142.50$
 D. 18 $t = 15$
6. Tosha is training for a marathon. She wants to run 120 km before the race. So far she has run 36 km. She plans to run the same distance each week until she has reached her goal. How many weeks will she need to reach her goal if she runs 12 km each week?
- A. 4 C. 6
 B. 5 D. 7

7. Rich earned \$2,500 more than 3 times the amount that Michael earned last year. Rich earned \$125,500 last year.

$m = \text{Michael's earning}$

Part A Write an equation that can be used to find how much money Michael earned last year.

$$125500 = 3m + 2500$$

Part B Solve the equation.

$$125500 - 2500 = 3m$$

$$123000 = 3m$$

Show your work.

ANS: $m = 41,000$

Math Words

Fill in the blanks.

8. To solve a word problem, first define the variable.
9. To solve $5x + 9 = 13$, first subtract 9 from both sides and then divide both sides by 5.

\Rightarrow

$$w = \text{weeks}$$

$$120 = 36 + 12w$$

$$84 = 12w$$

$$7 = w$$