

## Variables *and* Equations

**BEFORE**

You evaluated variable expressions.

**Now**

You'll solve equations with variables.

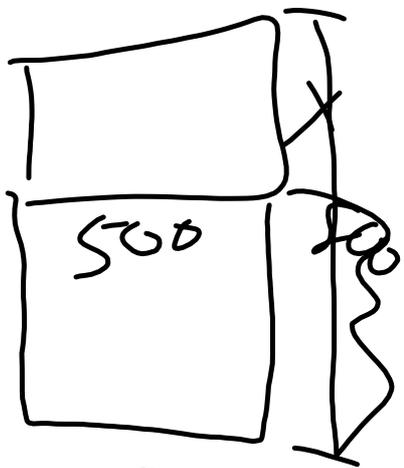
**WHY?**

So you can find worldwide sales of computers, as in Ex. 33.

$$14(45 \mp 5) + \underline{8} S$$

$$\boxed{630} \perp -145 + 8S$$

$$\textcircled{630 - 65}$$



$$500x$$

$$500(700 - x)$$

$$400000 + 500x$$

$$.27(500x) + .10(400000 + 500x)$$

$$85x + 44000$$

$$W = C + L$$

$$.25 + .065(32 - X)$$

$$.25 + 2.08 - .065x$$

$$2.33 - .065x$$

An **equation** is a mathematical sentence formed by placing an equal sign, =, between two expressions. A **solution** of an equation with a variable is a number that produces a true statement when it is substituted for the variable.

**Solving Equations** Finding all solutions of an equation is called **solving the equation**. You can use mental math to solve a simple equation by thinking of the equation as a question.

**Practice A**

For use with pages 85–89

**Write the verbal sentence as an equation.**

1. The sum of  $x$  and 5 is 13.
2. The difference of 10 and  $x$  is 4.
3. The product of  $-3$  and  $x$  is 18.
4. The quotient of 20 and  $x$  is  $-5$ .

$$x + 5 = 13$$
$$-3x = 18$$

$$10 - x = 4$$
$$\frac{20}{x} = -5$$

**Tell whether the given value of the variable is a solution of the equation.**

**5.**  $x + 14 = 5; x = 9$

**6.**  $24 - y = 18; y = 6$

7.  $-42 = 7a; a = -6$

$$-42 = 7(-6)$$

$$-42 = -42$$

✓ YES

8.  $\frac{c}{3} = -12; c = -4$

$$\frac{-4}{3} = -12$$

NO

Match the equation with the corresponding question. Then solve.

9.  $m + 3 = 18$  B

10.  $3m = 18$  D

11.  $3 = m + 18$  A

12.  $\frac{m}{3} = 18$  C

A. 3 equals what number plus 18?

B. What number plus 3 equals 18?

C. What number divided by 3 equals 18?

D. 3 times what number equals 18?

Solve the equation using mental math.

13.  $g + 11 = 16$

14.  $-6 + z = -14$

15.  $w - 6 = -2$

16.  $-12a = -60$

17.  $-36 = 4d$

18.  $\frac{k}{-8} = -7$

$\rightarrow g + 11 = 16 \rightarrow 11$   
 $g = 5$

$\frac{1}{4} \cdot -36 = \frac{-36}{4} = -9$

**19.** You are serving vegetable lasagna for a dinner party. There will be 15 people at the dinner. Each dish of lasagna will be cut into 6 pieces, and you expect each person to eat 2 pieces. How many dishes of lasagna do you need to make?

**a.** Let  $x$  represent the number of dishes of lasagna you need. Write an expression for the number of pieces in  $x$  dishes of lasagna.

**b.** How many pieces of lasagna do you need to feed 15 people?

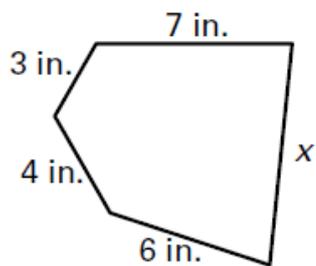
**c.** Use your answers from parts (a) and (b) to write an equation that you can use to find the number of dishes of lasagna needed.

**d.** Solve your equation to find how many dishes of lasagna you need.

$$6x = 30$$
$$x = 5$$

$$2(15) = 30$$

20. The perimeter of the figure is 28 inches.



- Write and simplify an equation that you can use to find  $x$ .
- Solve your equation. What is the value of  $x$ ?

$$\begin{aligned}7 + 3 + 4 + 6 + x &= 28 \\-20 + 20 + x &= 28 - 20 \\x &= 8\end{aligned}$$

