

LESSON 12.1

# Writing Expressions and Equations

Expression does NOT have an =  
 vs. Equation has an =

In your notebook, make a table of key words that can indicate addition, subtraction, multiplication, or division, like the one shown on page 583 of your textbook.

Goal: Write variable expressions and equations.

**EXAMPLE 1** Expressions: Adding and Subtracting

Write the phrase as an expression. Let  $x$  represent the number.

Phrase	Expression
$x$ cups of flour <b>increased by</b> 5 cups	$x + 5$
The <b>total</b> of 8 and a number	$8 + x$
A number <b>subtracted from</b> 14	$14 - x$
A number <b>decreased by</b> 3	

**Your turn now** Write the phrase as a variable expression.

1. A number $m$ increased by 1 $m + 1$	2. Seven less than a number $t$ $t - 7$
3. The difference of 6 and a number $v$ $6 - v$	4. Nine added to a number $y$ $9 + y$
5. The sum of 11 and a number $b$ $11 + b$	6. Fifteen fewer than a number $n$ $n - 15$

**WATCH OUT!**

Order is important with subtraction and division. "The quotient of a number and 6" means  $\frac{y}{6}$ , not  $\frac{6}{y}$ .

$12/x$

**EXAMPLE 2** Expressions: **Multiplying and Dividing**

Write the phrase as an expression. Let  $y$  represent the number.

Phrase	Expression
A number <b>multiplied by</b> 9 <i>X</i> $\cdot$ 9	$9 \cdot X$ , or $9X$
The <b>product</b> of a number and 22 <i>X</i> $\cdot$ 22	$22 \cdot X$ , or $22X$
12 <b>divided by</b> the number of feet 12 $\div$ <i>X</i>	$\frac{12}{X}$
The <b>quotient</b> of a number and 17 <i>X</i> $\div$ 17	$\frac{X}{17}$

**EXAMPLE 3** Writing Simple Equations

Write the sentence as an equation.

Sentence	Equation
A number $b$ added to 9 <b>is</b> 15. $b + 9 = 15$	$b + 9 = 15$
The quotient of 25 and a number $z$ <b>is</b> 50. $25 \div z = 50$	$\frac{25}{z} = 50$

**EXAMPLE 4** Modeling a Situation

**Beach House** A family is renting a beach house for a week-long summer vacation. The cost of renting the house is \$110 per person per week and the total cost of the house for the week is \$1320. Write a multiplication equation that you could use to find the number of people  $p$  that are going to the beach house.

**Solution**

The cost per person is **multiplied by** the number of people to get the total cost.

cost per person  $\cdot$  # of ppl = total cost  
 $110 \cdot p = 1,320$

**Your turn now** In Exercises 7–10, write the sentence as an equation.

**7.** The difference of 7 and a number  $a$  is 2.

**8.** A number  $w$  times 20 is 160.

**9.** A number  $p$  increased by 4 is 10.

**10.** The quotient of a number  $c$  and 3 is 17.

**11.** You bought a young tree that is 9 inches tall. According to the label on the tree, the tree will reach a height of 48 inches. Let  $g$  be the number of inches the tree will grow. Write an addition equation you could use to find  $g$ .