LESSON 5.1

Writing and Evaluating Expressions

CA Standards
AF 1.1
AF 1.2

Goal: Write expressions.

Writing Expressions

The following common words and phrases indicate addition, subtraction, multiplication and division.

Addition	Subtraction	Multiplication	Division
plus the sum of increased by total more than added to	minus the difference of decreased by fewer than less than subtracted from	times the product of multiplied by of	divided by the quotient of per

EXAMPLE 1 Translating Verbal Phrases

Order is important when translating verbal expressions that suggest subtraction and division. The difference of a number and 10 means $n - 10$, not $10 - n$. The quotient of a number and 9 means $n \div 9$, not $9 \div n$.

Verbal Phrase	Variable Expression
The sum of 8 and a number	8 + n
The difference of 24 and a number	24 − n
The product of 5 and a number	$5n$
The quotient of 35 and a number	35 n
Two thirds of a number	$\frac{2}{3}n$

Write the phrase as a variable expression using x.

1. A number decreased by 16	**2.** 72 divided by a number

EXAMPLE 2 Writing an Algebraic Expression

Biking You are taking a bike trip. After riding 8 miles, you change your speed to 12 miles per hour.

a. Write an expression for the total distance after traveling for t hours at 12 miles per hour?

b. What is the total distance if you travel for 2 hours at 12 miles per hour?

Solution

a. Write a verbal model.

Original distance	+	Speed	•	Time
8	+	12	•	t

Answer: An expression for the total distance is $8 + 12t$.

b. Substitute for t to find the total distance traveled.

$8 + 12(2) = 32$ Substitute 2 for t.

Answer: You travel a total of 32 miles.

Guided Practice **Use the information in Example 2.**

3. Find the total distance you travel if you travel for $1\frac{1}{2}$ hours at 12 miles per hour.

4. Suppose you change your bike speed to 10 miles per hour after traveling 8 miles. Find the total distance if you travel for 4 hours at 10 miles per hour.

EXAMPLE 3 Writing an Expression with Two Variables

Online Shopping On a website, it costs \$.99 to download a song and \$12.99 to download an entire album.

a. Write an expression to find the remaining balance on a \$20 gift card.

b. You decide to download 5 songs and 1 album. What is the remaining balance on your gift card?

Solution

a. Write a verbal model. Let s be the number of songs and let a be the number of albums.

Amount on gift card $-$ { Cost per song $\cdot$ Number of songs $+$ Cost per album $\cdot$ Number of albums }

$20 - (0.99 \cdot s + 12.99 \cdot a)$

Answer: An expression for the remaining balance on your gift card is $20 - (0.99s + 12.99a)$.

b. Substitute for s and a to find the remaining balance on your gift card.

$20 - [0.99(\ 5\ ) + 12.99(\ 1\ )] =$ 2.06 Substitute 5 for s and 1 for a.

Answer: You have \$2.06 remaining on your gift card.

Guided Practice **Use the information in Example 3.**

Homework

5. Suppose the amount of your gift card is \$30. Find the remaining balance on your gift card if you decide to download 3 songs and 2 albums.