LESSON 7.4

NAME _____ DATE _____

Reteaching with Practice

For use with pages 418–424

GOAL **Choose the best method to solve a linear system and use a system to model real-life problems**

EXAMPLE 1 Choosing a Solution Method

Your cousin borrowed $6000, some on a home-equity loan at an interest rate of 9.5% and the rest on a consumer loan at an interest rate of 11%. Her total interest paid was $645. How much did she borrow at each rate?

SOLUTION

Verbal Model

[Home-equity loan amount] + [Consumer loan amount] = [Total loan]

[Home-equity loan rate] · [Home-equity loan amount] + [Consumer loan rate] · [Consumer loan amount] = [Total interest paid]

Labels

Home-equity loan amount = x (dollars)

Consumer loan amount = y (dollars)

Total loan = 6000 (dollars)

Home-equity loan rate = 0.095 (percent written in decimal form)

Consumer loan rate = 0.11 (percent written in decimal form)

Total interest paid = 645 (dollars)

Algebraic Model

$x + y = 6000$ Equation 1 (loan)

$0.095x + 0.11y = 645$ Equation 2 (interest)

Because the coefficients of x and y are 1 in Equation 1, use the substitution method. You can solve Equation 1 for x and substitute the result into Equation 2. You will obtain 5000 for y. Substitute 5000 into Equation 1 and solve for x. You will obtain 1000 for x.

The solution is $1000 borrowed at 9.5% and $5000 borrowed at 11%.

Exercise for Example 1

1. Choose a method to solve the linear system. Explain your choice.

a. $2x - y = 3$
$x + 3y = 5$

b. $4x + 4y = 16$
$-2x + 5y = 9$

c. $x - 3y = 3$
$5x + 2y = 14$

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EXAMPLE 2 Solving a Cost Problem

For a community bake sale, you purchased 12 pounds of sugar and 15 pounds of flour. Your total cost was \$9.30. The next day, at the same prices, you purchased 4 pounds of sugar and 10 pounds of flour. Your total cost the second day was \$4.60. Find the cost per pound of the sugar and the flour purchases.

SOLUTION

Verbal Model

Amount of sugar Day 1	·	Cost of sugar	+	Amount of flour Day 1	·	Cost of flour	=	Total cost Day 1
Amount of sugar Day 2	·	Cost of sugar	+	Amount of flour Day 2	·	Cost of flour	=	Total cost Day 2

Labels

Amount of sugar Day 1 = 12	(pounds)
Amount of flour Day 1 = 15	(pounds)
Amount of sugar Day 2 = 4	(pounds)
Amount of flour Day 2 = 10	(pounds)
Cost of sugar = x	(dollars per pound)
Cost of flour = y	(dollars per pound)
Total cost Day 1 = 9.30	(dollars)
Total cost Day 2 = 4.60	(dollars)

Algebraic Model

$12x + 15y = 9.30$ Equation 1 (Purchases–Day 1)

$4x + 10y = 4.60$ Equation 2 (Purchases–Day 2)

Use linear combinations to solve this linear system because none of the variables has a coefficient of 1 or -1. You can get the coefficients of x to be opposites by multiplying Equation 2 by -3. You will obtain 0.30 for y. Substitute 0.30 for y into Equation 1 and solve for x. You will obtain 0.40 for x.

The solution of the linear system is (0.40, 0.30). You conclude that sugar costs \$.40 per pound and flour costs \$.30 per pound.

Exercise for Example 2

2. Rework Example 2 if the cost of the first purchase was \$7.95 and the cost of the second purchase was \$3.90.