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**Grade 8: Lesson 13** Solve Systems by Substitution

Complete the following exercises. You may use a calculator as needed.

1. **Leveled Practice** A piggy bank contains 70 coins. The coins are dimes and nickels worth \$5.50. Use substitution to solve the system of equations to find how many dimes and nickels are in the piggy bank.

$$d + n = 70$$

$$0.1d + 0.05n = 5.5$$

**STEP 1** Substitute for d to solve for n. Fill in the blanks below.

$$0.10d + 0.05n = 5.5$$

$$0.1 \cdot ( \quad ) + 0.05n = 5.5$$

$$\quad - \quad + 0.05n = 5.5$$

$$7 + \quad = 5.5$$

$$-0.05n = \quad$$

$$n = \quad$$

**STEP 2** Substitute for n to solve for d. Fill in the blanks below.

$$d + n = 70$$

$$d + \quad = 70$$

$$d = \quad$$

There are \_\_\_\_\_ dimes and \_\_\_\_\_ nickels in the piggy bank.

2. Use substitution to solve the system of equations.

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

$$3y - 2x = 0$$

3. Use substitution to solve the system of equations.

$$y + 1 = -2x$$

$$4y + 8x = -4$$

4. Jake buys a fruit smoothie and a protein bar for \$5.90. Kobe buys 2 fruit smoothies and 4 protein bars. He pays \$16.80. What is the cost of each fruit smoothie and each protein bar?

$$x + y = 5.90$$

$$2x + 4y = 16.80$$

5. Farmer Brown planted corn and wheat on 370 acres of his land. The cost of planting and harvesting corn,  $c$ , is \$280 per acre. The cost of planting and harvesting wheat,  $w$ , is \$135 per acre. If Farmer Brown's total cost was \$83,300, how many more acres of corn than wheat did he plant?

$$\begin{aligned}c + w &= 370 \\280c + 135w &= 83,300\end{aligned}$$

6. a. Use substitution to solve the system of equations.

$$\begin{aligned}y &= 5x + 2 \\12.5x + 2.5y &= 5\end{aligned}$$

- b. Which expression would be easier to substitute into the other equation in order to solve the problem? Explain.

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