Name _____ Date _____ Class _____

LESSON
4-4

Problem Solving
Determinants and Cramer's Rule

As Kristin prepares for a triathlon, she makes a chart of her exercise time, along with the calories burned each day. Part of her chart is shown in the table below. How many calories per hour does she burn for each activity?

Triathlon Training Record				
Day	Swimming (h)	Cycling (h)	Running (h)	Calories Burned
Friday	1.5	2.0	0.5	2450
Saturday	2.5	3.0	1.5	4310
Sunday	2.0	1.5	1.6	3150

1. Write a system of equations that relates Kristin's exercise time to the number of calories burned each day. Use *s*, *c*, and *r* for the calories burned per hour for the three activities.

   _____

2. Write the coefficient matrix for the system of equations.

   _____

3. What is the value, *D*, for the determinant of the coefficient matrix?

   _____

4. Use Cramer's rule to solve this system of equations. Give the values for *s*, *c*, and *r*.

   _____

Choose the letter for the best answer.

5. Ty has a bag of pennies, nickels, and dimes. He has 10 times as many pennies as dimes. He has a total of 52 coins and twice as many nickels as dimes. Which coefficient matrix could you use to solve this problem?

   A $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 0 & -10 \\ 0 & 1 & -2 \end{bmatrix}$ C $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 0 & -10 \\ 0 & -1 & 2 \end{bmatrix}$

   B $\begin{bmatrix} 1 & 1 & 1 \\ 10 & 0 & -1 \\ 0 & 2 & -1 \end{bmatrix}$ D $\begin{bmatrix} 1 & 1 & 1 \\ 10 & 0 & -1 \\ 0 & -2 & 1 \end{bmatrix}$

6. Phyllis collects silver dollars and Kennedy half-dollars. She has 5 times as many half-dollars as dollar coins. She has a total of 192 coins. Which solution could you use to find the number of silver dollars Phyllis has?

   A $\dfrac{\begin{vmatrix} 192 & 1 \\ 0 & -5 \end{vmatrix}}{-6}$ C $\dfrac{\begin{vmatrix} 1 & 192 \\ -5 & 0 \end{vmatrix}}{-6}$

   B $\dfrac{\begin{vmatrix} 1 & 192 \\ 1 & 0 \end{vmatrix}}{-6}$ D $\dfrac{\begin{vmatrix} 192 & 1 \\ 0 & 1 \end{vmatrix}}{-6}$

Holt Algebra 2

Name _____ Date _____ Class _____

⭐ **LESSON 4-4**

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1. Write a system of equations that relates Kristin's exercise time to the number of calories burned each day. Use s, c, and r for the calories burned per hour for the three activities.

$$\begin{cases} 1.5s + 2c + 0.5r = 2450 \\ 2.5s + 3c + 1.5r = 4310 \\ 2s + 1.5c + 1.6r = 3150 \end{cases}$$

2. Write the coefficient matrix for the system of equations.

$$D = \begin{bmatrix} 1.5 & 2.0 & 0.5 \\ 2.5 & 3.0 & 1.5 \\ 2.0 & 1.5 & 1.6 \end{bmatrix}$$

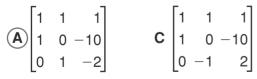3. What is the value, D, for the determinant of the coefficient matrix?

$$D = 0.7$$

4. Use Cramer's rule to solve this system of equations. Give the values for s, c, and r.

$$s = 590; \ c = 620; \ r = 650$$

Choose the letter for the best answer.

5. Ty has a bag of pennies, nickels, and dimes. He has 10 times as many pennies as dimes. He has a total of 52 coins and twice as many nickels as dimes. Which coefficient matrix could you use to solve this problem?

Ⓐ $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 0 & -10 \\ 0 & 1 & -2 \end{bmatrix}$ C $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 0 & -10 \\ 0 & -1 & 2 \end{bmatrix}$

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Holt Algebra 2