Name: _____ Algebra 2
Period: _____ Date: _____ Matrix Operations Quiz Review

#1 and #2 are Bonus Questions

Solve each matrix equation.

1. $\begin{bmatrix} 4x \\ 5 \end{bmatrix} = \begin{bmatrix} 15 + x \\ 2y - 1 \end{bmatrix}$

2. $\begin{bmatrix} x + 3y \\ 3x + y \end{bmatrix} = \begin{bmatrix} -13 \\ 1 \end{bmatrix}$

Use matrices P-V below to answer questions 3-8.

$$P = \begin{bmatrix} 0 & 14 \\ 2 & 21 \end{bmatrix} \qquad Q = \begin{bmatrix} 1 & 2 \\ 0 & -4 \end{bmatrix} \qquad R = \begin{bmatrix} 1 & \frac{1}{2} \\ 0 & -\frac{1}{4} \end{bmatrix} \qquad S = \begin{bmatrix} -\frac{3}{4} & \frac{1}{2} \\ \frac{1}{14} & 0 \end{bmatrix}$$

$$T = \begin{bmatrix} -11 & 7 & 5 \\ -6 & -3 & 8 \end{bmatrix} \qquad U = \begin{bmatrix} 3 & 0 & -2 \\ 4 & -9 & -5 \end{bmatrix} \qquad V = \begin{bmatrix} 2 & 4 \\ -1 & 0 \\ 3 & -1 \end{bmatrix}$$

3. The dimensions of V

4. P + Q

5. Q – U

6. -2T

7. P + 4R

8. VU

2. The Lucrative Bank has three branches in Durham: Northgate (N), Downtown (D), and South Square (S). Matrix A shows the number of accounts of each type--checking (c), savings (s), and market (m)--at each branch office on January 1.

$$A = \begin{array}{c|ccc} & c & s & m \\ N & 40039 & 10135 & 512 \\ D & 15231 & 8751 & 105 \\ S & 25612 & 12187 & 97 \end{array}$$

Matrix B shows the number of accounts of each type at each branch that were opened during the first quarter, and matrix C shows the number of accounts closed during the first quarter.

$$B = \begin{array}{c|ccc} & c & s & m \\ N & 5209 & 2506 & 48 \\ D & 1224 & 405 & 17 \\ S & 2055 & 771 & 21 \end{array} \qquad C = \begin{array}{c|ccc} & c & s & m \\ N & 2780 & 1100 & 32 \\ D & 565 & 189 & 25 \\ S & 824 & 235 & 14 \end{array}$$

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a.) Calculate the matrix representing the number of accounts of each type at each location at the end of the first quarter.

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b.) The sudden closing of a large textile plant has led bank analysts to estimate that all accounts will decline by 7% during the second quarter. Calculate a matrix that represents the anticipated number of each type of account at each branch at the end of the second quarter. Round fractions of accounts to integer values.

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c.) The bank president announces that at the end of the second quarter, the Lucrative Bank will merge with the Me D. Okra Bank, which has branches in the same locations as those of the Lucrative Bank. The accounts at each branch of the Me D. Okra Bank at the end of the second quarter are:

	c	s	m
N	1345	2531	52
D	783	1987	137
S	2106	3765	813

Find the total number of accounts of each type at each branch of the bank formed by the merger of the two banks at the end of the second quarter.

The following table gives fuel and electric requirements per mile associated with gasoline and electric automobiles:

	NUMBER OF GALLONS/MILE	NUMBER OF kW-hr/MILE
Gas Car	0.05	0
Hybrid Car	0.02	0.1
Electric Car	0	0.25

The following table gives an average cost for gasoline and electricity.

Cost per gallon of gasoline	$3.00
Cost per kW-hr of electricity	$0.05

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a. Let matrix A represent the gasoline and electricity consumption and matrix B represent the costs of gasoline and electricity.

b. Find AB and describe what the entries of the product matrix represent.

c. Assume you drive 12,000 miles per year. What are the yearly costs associated with driving the three types of cars?
