Name: KEY Date: _____ Hr: _____

Algebra 2/Trig
CH 4 Review

On the blank next to the operation, write "Yes" if the operation is possible, or "No" if the operation is not possible for **all** 2 x 2 matrices A, B, and C.

1.) AB = BA NO

2.) A ÷ B NO

3.) (A + B) + C = A + (B + C) YES

4.) A + B = B + A YES

Give the dimensions for the following matrices.

5.) $A = \begin{bmatrix} -2 & 5 & 11 \\ 7 & -3 & 4 \end{bmatrix}$ 2x3

6.) $B = \begin{bmatrix} 0 & 1 \\ 3 & 7 \\ -6 & 15 \end{bmatrix}$ 3x2

7.) Give the address at the indicated entry in problem #5 above: entry -3: a_{22}

8.) The cost of an adult ticket to a football game is $4.00, and a student ticket is $2.50. The total amount received from 600 tickets was $1830.

a. How many adult tickets were sold? 220

b. How many student tickets were sold? 380

$x + y = 600$

$4x + 2.5y = 1830$

9.) If matrix A is a 2 x 4 matrix, and matrix B is a 4 x 3 matrix, what are the dimensions of matrix AB?

2×3

10.) Which of the following matrices does not have an inverse? C

a. $\begin{bmatrix} 2 & -5 \\ -1 & 3 \end{bmatrix}$ b. $\begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$ c. $\begin{bmatrix} -3 & 2 \\ 9 & -6 \end{bmatrix}$

11.) Joshua wants to mix two types of candy. Candy A costs \$2.50 per pound and candy B costs \$4.50 per pound. Joshua wants to make 10 pounds of a mixture that will sell for \$3.70 per pound.

a. How many pounds of candy A are in the mixture? 4 lbs

b. How many pounds of candy B are in the mixtures? 6 lbs

$A + B = 10$

$2.50A + 4.50B = 3.7(10)$

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12.) The measure of a triangle's largest angle is 5 times the measure of the smallest angle. The measure of the remaining angle of the triangle is the average of the measures of the largest and smallest angles.

x = small
y = middle
z = large

a. Write a system of three equations using the measure of the angles of the triangle.

b. Find the measures of the angles.

$x + y + z = 180$

$z = 5x$

$y = \frac{x+z}{2}$

$x + y + z = 180$

$5x - z = 0$

$x - 2y + z = 0$

$x = 20°$

$y = 60°$

$z = 100°$

Write a matrix equation to solve each system of linear equations, if possible.

13.) $\begin{cases} 5x - 7y + 4z = -3 \\ 3x - y + 2z = 1 \\ -2x - 3y + 5z = 2 \end{cases}$

$\begin{bmatrix} 5 & -7 & 4 \\ 3 & -1 & 2 \\ -2 & -3 & 5 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -3 \\ 1 \\ 2 \end{bmatrix}$

(0, 1, 1)

14.) $2w + 5x - 4y + 6z = 0$
$2x + y - 7z = 52$
$4w + 8x - 7y + 14z = -25$
$3w + 6x - 5y + 10z = -16$

Let the order be (w, x, y, z).

$w = -3$
$x = 8$
$y = 1$

15.) Bob won $25,000 in the lottery. (Lucky Bob!) He wants to invest some in an account that pays 15% per year and put the rest into an account that pays 7% per year. Bob wants to earn $3000 in interest per year. Write and solve a system of equations to find how much he should invest at each interest rate.

$x = 15\%$
$y = 7\%$

$x + y = 25,000$ (investment)
$.15x + .07y = 3000$ (interest)

15,625 at 15%
9,375 at 7%

16.) A brokerage firm invested in three different mutual funds:

- Mutual fund A contains 80% low-risk, 15% medium-risk and 5% high-risk stocks.
- Mutual fund B contains 20% low-risk, 70% medium-risk and 10% high-risk stocks.
- Mutual fund C contains 50% low-risk, 10% medium-risk and 40% high-risk stocks.

A total of $16,000 is invested in low-risk stocks, $9,000 in medium risk stocks and $6,000 in high-risk stocks.

A. Write a system of equations that represents the amount of money invested in each mutual fund.

$.80A + .20B + .50C = 16000$
$.15A + .70B + .10C = 9000$
$.05A + .10B + .40C = 6000$

B. Write the matrix equation that represents the system.

$$\begin{bmatrix} .80 & .20 & .50 \\ .15 & .70 & .10 \\ .05 & .10 & .40 \end{bmatrix} \begin{bmatrix} A \\ B \\ C \end{bmatrix} = \begin{bmatrix} 16000 \\ 9000 \\ 6000 \end{bmatrix}$$

C. Solve the matrix equation.

$A = \$10,615.38$
$B = \$8,948.72$
$C = \$11,435.90$

Let $A = \begin{bmatrix} -9 & 2 \\ 4 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 7 & -5 \\ 2 & 3 \end{bmatrix}$, $C = \begin{bmatrix} 1 & -2 & 1 \\ 0 & 3 & -4 \end{bmatrix}$ $D = \begin{bmatrix} 4 & 5 \\ -2 & 1 \\ 3 & 0 \end{bmatrix}$

Find the following.

17.) AC $\begin{bmatrix} -9 & 24 & -17 \\ 4 & -5 & 0 \end{bmatrix}$

18.) CD $\begin{bmatrix} 11 & 3 \\ -18 & 3 \end{bmatrix}$

19.) 5B $\begin{bmatrix} 35 & -25 \\ 10 & 15 \end{bmatrix}$

20.) A – 2B $\begin{bmatrix} -23 & 12 \\ 0 & -5 \end{bmatrix}$

21.) A + B $\begin{bmatrix} -2 & -3 \\ 6 & 4 \end{bmatrix}$

22.) B^{-1} $\begin{bmatrix} \frac{3}{31} & \frac{5}{31} \\ \frac{-2}{31} & \frac{1}{31} \end{bmatrix}$

23.) A^2 $\begin{bmatrix} 89 & -16 \\ -32 & 9 \end{bmatrix}$

Solve for x and y.

24.) $\begin{bmatrix} 6 & 7 \\ 2y+8 & -3x+5 \end{bmatrix} = \begin{bmatrix} 6 & 7 \\ 10y-8 & 2x-10 \end{bmatrix}$

$2y + 8 = 10y - 8$ $\quad -3x + 5 = 2x - 10$

$y = 2$ $\quad x = 3$

25.) $\begin{bmatrix} 5 & -3 & 2 \\ x & 2 & -1 \end{bmatrix} \begin{bmatrix} 4 & -3 \\ 0 & 5 \\ 8 & 1 \end{bmatrix} = \begin{bmatrix} 36 & -28 \\ -8 & 9 \end{bmatrix}$

$4x - 8 = -8$

$x = 0$