Name: **Matrix Madness** **1.4H**

Ready, Set, Go!

Ready

Topic: Equivalent Equations

The pairs of equations below are equivalent. Determine what was done to the first equation in order to obtain the second equation. (For example, everything multiplied by 5 or Multiplicative Property of Equality) If more than one operation was performed please indicate the operations and the order they were performed.

1. $x + y = 5$
   $3x + 3y = 15$
   everything multiplied by 3

2. $4x + 3y = 12$
   $x + \frac{3}{4}y = 3$
   everything divided by 4

3. $6x + 4y = 20$
   $y = -\frac{3}{2}x + 5$
   $6x$ subtracted from both sides, and everything divided by 4

Determine whether or not the pairs of equations below are equivalent. If equivalent state the operations used to create the second from the first. If not equivalent show why not.

4. $12x + 9y = 21$
   $4x + 3y = 7$
   Equivalent, everything was divided by 3

5. $2x + 5y = 10$
   $y = \frac{2}{5}x + 10$
   Not equivalent

6. $54x - 42y = 90$
   $9x + 7y = 15$
   Not Equivalent

Set

Topic: Matrix Multiplication

The equipment manager for the school athletics department is attempting to restock some of the needed uniform and equipment items for the upcoming seasons of baseball and football. It has been determined based on current levels of inventory and the number of players that will be returning that more socks, pants and helmets will be needed. The equipment manager has organized the information in the matrix below.

	Socks	*Pants*	*Helmets*
Baseball	13	15	7
Football	24	45	20

The school has contracted with two supply stores in the past for equipment needs. The matrix below shows how much each store charges for the needed items.

	Big Sky Sportingoods	*Play It Forever*
Cost per pair of socks	3.50	3.00
Cost per pair of pants	35.00	40.00
Cost per helmet	22.00	45.50

7. Calculate the values of *a, b, c,* and *d* in the "Total Costs Matrix" below.

Total Cost Matrix

	Big Sky Sportingoods	*Play It Forever*
Baseball	a	b
Football	c	d

$$\begin{bmatrix} \mathbf{724.50} & \mathbf{957.50} \\ \mathbf{2099.00} & \mathbf{2782.00} \end{bmatrix}$$

8. Explain, in detail, how you would use the numbers in the first two matrices above to obtain the values for the "Total Costs Matrix".
   Multiply each of the rows in the first matrix by the values in the columns of the cost matrix. Then find the sum of each set of products.

9. Alexandra, Megan, and Brittney want to calculate their final grades in math class. They know what their averages are for tests, projects, homework, and quizzes. They also know that tests are 40% of the grade, projects are 15%, homework 25%, and quizzes 20%. Use the following matrices to calculate their final grades:

	Tests	*Projects*	*Homework*	*Quizzes*
Alexandra	92	100	89	80
Megan	72	85	80	75
Brittney	88	78	85	92

	Weight
Tests	0.4
Projects	0.15
Homework	0.25
Quizzes	0.2

Alexandra has a 90%, Megan has a 77%, and Brittney has an 87%

Given the following matrices, perform the indicated operation when possible.

$A=\begin{bmatrix}4 & 2 & 0\\ 2 & -4 & 8\end{bmatrix}$ $B=\begin{bmatrix}-15\\ -3\\ -9\end{bmatrix}$ $C=\begin{bmatrix}1 & 2\\ 3 & -3\\ -2 & -1\end{bmatrix}$

10. $\frac{1}{3}AB$

$\begin{bmatrix}\mathbf{-22}\\ \mathbf{-30}\end{bmatrix}$

11. CB

not possible

12. AC

$\begin{bmatrix}\mathbf{10} & \mathbf{2}\\ \mathbf{-26} & \mathbf{8}\end{bmatrix}$

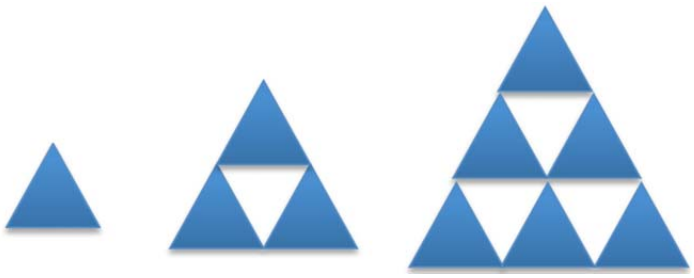
13. $\frac{CA}{2}$

$\begin{bmatrix}\mathbf{4} & \mathbf{-3} & \mathbf{8}\\ \mathbf{3} & \mathbf{9} & \mathbf{-12}\\ \mathbf{-5} & \mathbf{0} & \mathbf{-4}\end{bmatrix}$

Go

Topic: Representing visual patterns of change with equations, finding patterns

Create tables and equations for each attribute of the visual pattern below. If you are unable to create an equation then state the pattern you notice.
(All triangles are equilateral and the side length of the triangle in step 1 is one unit in length.)



Step 1 **Step 2** **Step 3**

14. The width of the large triangle with respect to the Step number.
    Width = Step#

15. The number of small triangles with side length of one in the large triangle with respect to the Step number.
    $(\textbf{Step\#})^2 = \textbf{number of small triangles}$

16. The perimeter of the large triangle with respect to the Step number.
    $3 \times \textbf{Step\#} = \textbf{Perimeter}$

17. The number of 60° angles in the figure with respect to the Step number.
    $3 \times (\textbf{Step\#})^2 = \textbf{number of 60° angles}$