5.2H Matrix Operations **Name: _____ Per: _____**

SHOW YOUR WORK, IN PENCIL

1. McKaylee decides to make 3 different kinds of rolls to sell (plain, frosted, and cinnamon) and uses matrices to track her data. Organize each of the following into a matrix and then create new matrices to answer each of the following questions. (Leave the quantity, as dozens)
   - On Halloween, she makes 20 dozen **plain** rolls, 20 dozen **cinnamon** rolls, and 30 dozen **frosted** rolls.
   - On Thanksgiving, she makes 15 dozen **plain** rolls, 40 dozen **frosted** rolls, and 10 dozen **cinnamon** rolls.

   a. What is the total (in dozen) of each type of roll for Halloween AND Thanksgiving?

   b. What is the difference in the number (dozen) of rolls between Halloween & Thanksgiving?

   c. She ran out of frosted rolls for both holidays and decides to double ONLY the number of frosted rolls. How many would she need to make for both holidays? Show the two different matrices.

   d. For Mother's Day she makes 5 times the number of each roll she made for Halloween. Show your work and calculate the total number of each type of roll for Mother's Day?

   e. For Father's Day she makes $\frac{1}{5}$ the number of each roll as she does for Thanksgiving. List the total number of each type of roll for Father's Day?

   f. On average (using the data for the FOUR holidays above), how many of each type of roll should she make for any holiday?

   g. She calculates that each type of roll has a difference profit amount. For plain she makes $7 per dozen. For frosted she profits $4.75 a dozen and cinnamon she pockets $5.50/dozen. Find the profit for each type of roll, for an average holiday. (Use your data from above)

   h. What would be her grand total profit?

2. Fill in the boxes for the following matrix operation to find selected data.

$$\begin{bmatrix} 5 & -2 & 3 & 6 \\ 7 & 1 & -4 & 2 \end{bmatrix} + \begin{bmatrix} 1 & 3 & 5 & -7 \\ 4 & -3 & 2 & 5 \end{bmatrix} = \begin{bmatrix} - & - & \square & - \\ - & \square & - & - \end{bmatrix}$$

Add or subtract the following matrices, if possible. If not possible, explain why.

3. $\begin{bmatrix} 0 & 1 & 2 \\ 9 & 8 & 7 \end{bmatrix} + \begin{bmatrix} 6 & 5 & 4 \\ 3 & 4 & 5 \end{bmatrix} =$

4. $\begin{bmatrix} -1 & 2 & 0 \\ 0 & 3 & 6 \end{bmatrix} + \begin{bmatrix} 0 & -4 & 3 \\ 9 & -4 & -3 \end{bmatrix} =$

5. $\begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix} + \begin{bmatrix} 4 & 5 \\ 7 & 8 \end{bmatrix} =$

6. Explain how to add matrices. _____

7. At the end of the day, Sienna's Sock Shop counts how many socks they have left in the store. The results of the Wednesday and Thursday counts are shown in the matrices below. The shop receives no new socks on either day. Create a new matrix showing how many of each type of sock was sold.

8.

Wednesday's Count

	Long	Short
Red	38	68
Yellow	32	39
Blue	41	47
White	31	39

Thursday's Count

	Long	Short
Red	24	61
Yellow	30	28
Blue	29	32
White	21	29

Henry attends school at Jackson College. The prices for 2018 are in the given matrix. The college plans to **triple** the cost of **science classes** to cover lab fees, **literature classes** will be **doubled,** and **math classes** will cost **half** as much. Create a new matrix showing the costs of taking class for the next year.

Courses	Credit Hours 2	3	4
Math	$40	$60	$70
Science	$70	$90	$130
Literature	$30	$30	$45

Set-up the matrices and perform the following operations. **If not possible, explain why**.

$$A = \begin{bmatrix} -8 & 10 & -1 \\ 10 & -5 & 6 \end{bmatrix}, \quad B = \begin{bmatrix} 9 & 1 & 0 \\ 1 & 5 & -3 \end{bmatrix}, \quad C = \begin{bmatrix} 2 & -8 \\ 5 & 8 \end{bmatrix}, \quad D = \begin{bmatrix} 10 & 7 \\ -3 & -2 \end{bmatrix}$$

9. $A + B$

10. $B + A$

11. $A - B$

12. $B - A$

13. $-3C$

14. $\frac{1}{2}C + D$

15. $D - 4A$

16. $2A - 2B$