Calculations at the Crazy Cookie Company

Name: _____**Class:** _____**Date:** _____

You have been hired to be the accountant(s) for the Crazy Cookie Company. They want you to help them track their costs and profits.
Matrix multiplication will help you do your job. First, you must know how it's done.
Work through the problems on your handheld, using the CrazyCookie.tns file as your guide.

Problem Set 1:

$$\begin{bmatrix} -3 & 3 \\ 5 & 0 \end{bmatrix} \bullet \begin{bmatrix} -1 & 0 \\ 3 & -4 \end{bmatrix} = \begin{bmatrix} & \\ & \end{bmatrix} \qquad \begin{bmatrix} 10 \\ -5 \end{bmatrix} \bullet \begin{bmatrix} 12 & 3 \\ 0 & 0 \end{bmatrix} = \begin{bmatrix} & \\ & \end{bmatrix}$$

$$\begin{bmatrix} 12 & 3 \end{bmatrix} \bullet \begin{bmatrix} 10 \\ -5 \end{bmatrix} = \begin{bmatrix} & \end{bmatrix} \qquad\qquad [\underline{\quad} \text{ X } \underline{\quad}] \quad + \quad [\underline{\quad} \text{ X } \underline{\quad}]$$

$$\begin{bmatrix} -3 & 5 \end{bmatrix} \bullet \begin{bmatrix} -3 & 0 \\ 5 & 0 \end{bmatrix} = \begin{bmatrix} & \end{bmatrix}$$

Product dimensions: _____ by _____ $\qquad \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} \bullet \begin{bmatrix} 7 \\ 8 \\ 9 \end{bmatrix} = \begin{bmatrix} & \\ & \end{bmatrix}$

The _____dimension of the left matrix must match the _____dimension of the right matrix to find a matrix product.

Product dimensions come from the number of _____in the left matrix BY the number of _____in the right matrix of the product.

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Problem Set 2:

Product dimensions will be _____ by _____.

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix} \cdot \begin{bmatrix} 7 & 8 & 9 & 10 \\ 11 & 12 & 13 & 14 \end{bmatrix} = \begin{bmatrix} & & & \\ & & & \\ & & & \end{bmatrix}$$

$\begin{bmatrix} 1 & 2 \end{bmatrix} \cdot \begin{bmatrix} 7 \\ 11 \end{bmatrix}$ $\begin{bmatrix} 1 & 2 \end{bmatrix} \cdot \begin{bmatrix} 8 \\ 12 \end{bmatrix}$ $\begin{bmatrix} 1 & 2 \end{bmatrix} \cdot \begin{bmatrix} 9 \\ 13 \end{bmatrix}$ $\begin{bmatrix} 1 & 2 \end{bmatrix} \cdot \begin{bmatrix} 10 \\ 14 \end{bmatrix}$

___ + ___ = ___   ___ + ___ = ___   ___ + ___ = ___   ___ + ___ = ___

$\begin{bmatrix} 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} 7 \\ 11 \end{bmatrix}$ $\begin{bmatrix} 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} 8 \\ 12 \end{bmatrix}$ $\begin{bmatrix} 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} 9 \\ 13 \end{bmatrix}$ $\begin{bmatrix} 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} 10 \\ 14 \end{bmatrix}$

___ + ___ = ___   ___ + ___ = ___   ___ + ___ = ___   ___ + ___ = ___

$\begin{bmatrix} 5 & 6 \end{bmatrix} \cdot \begin{bmatrix} 7 \\ 11 \end{bmatrix}$ $\begin{bmatrix} 5 & 6 \end{bmatrix} \cdot \begin{bmatrix} 8 \\ 12 \end{bmatrix}$ $\begin{bmatrix} 5 & 6 \end{bmatrix} \cdot \begin{bmatrix} 9 \\ 13 \end{bmatrix}$ $\begin{bmatrix} 5 & 6 \end{bmatrix} \cdot \begin{bmatrix} 10 \\ 14 \end{bmatrix}$

___ + ___ = ___   ___ + ___ = ___   ___ + ___ = ___   ___ + ___ = ___

Fill in the result matrix: $\begin{bmatrix} \_\_ & \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ & \_\_ \end{bmatrix}$

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Problem Set 3:

Design a table (using matrices) that will display cost and profit for all three stores. Decide which information will be located in each cell of the matrix and how to go about calculating each element of the matrix.

Cost and Profit Data (per cookie)

	Unit Cost	Profit (per unit)
Chocolate Chip	$0.15	$0.20
Peanut Butter	$0.10	$0.25
Snicker Doodle	$0.08	$0.15
Decorated	$0.20	$0.10

Sales data (by store)

	Chocolate Chip	Peanut Butter	Snicker Doodle	Decorated
Store 1	120	97	64	75
Store 2	80	59	36	60
Store 3	72	84	29	48

What will be the dimensions of the new product matrix?_____.

Why?_____.

Fill in and <u>label</u> the blank table on the next page. Place Xs through unused areas of the table. On the lines that follow the table, explain how you obtained your results, including the reasons why the results are valid.

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