Fun with Vectors: Practice with Matricies

1. Write the dimensions of each matrix. (Recall that the dimensions of a matrix are written mxn where m is the number of rows and n is the number of columns.)

a) $\begin{bmatrix} -1 & 6 \\ 0 & -4 \\ 2 & 1 \end{bmatrix}$

b) $\begin{bmatrix} 4 & -8 & 0 \\ -1 & 2 & -2 \\ 1 & 5 & 4 \end{bmatrix}$

c) $\begin{bmatrix} 4 & 0 & -1 & 5 & -9 \\ 3 & -7 & -2 & 3 & 6 \end{bmatrix}$

2. Add these matrices. (Hint: Just like vectors, to add matrices you add their corresponding entries)

a) $\begin{bmatrix} 3 & 7 \\ 1 & 4 \end{bmatrix} + \begin{bmatrix} 1 & 2 \\ 5 & 3 \end{bmatrix}$

b) $\begin{bmatrix} 4 & 9 & -6 \\ 2 & -2 & -3 \end{bmatrix} + \begin{bmatrix} -2 & -3 & 4 \\ -1 & 2 & -1 \end{bmatrix}$

c) $\begin{bmatrix} 2 & 5 & -2 \\ 3 & 6 & 2 \end{bmatrix} + \begin{bmatrix} -4 & 7 & 9 \\ 3 & 2 & -1 \end{bmatrix}$

d) $\begin{bmatrix} -9 & 0 & -6 \\ 5 & -4 & -2 \\ -3 & 2 & -1 \\ 1 & -6 & 7 \end{bmatrix} + \begin{bmatrix} 7 & 2 & 0 \\ -1 & 9 & -4 \\ 3 & 7 & 5 \\ 0 & 8 & 1 \end{bmatrix}$

3. Subtract these matrices.

a) $\begin{bmatrix} -4 & 2 \\ 5 & 1 \end{bmatrix} - \begin{bmatrix} 3 & -1 \\ -5 & -7 \end{bmatrix}$

b) $\begin{bmatrix} -1 & 6 \\ 3 & -5 \end{bmatrix} - \begin{bmatrix} 4 & -2 \\ -7 & 2 \end{bmatrix}$

c) $\begin{bmatrix} 4 & -3 \\ 1 & 2 \\ -2 & 5 \end{bmatrix} - \begin{bmatrix} -1 & -3 \\ 7 & 9 \\ -4 & 1 \end{bmatrix}$

d) $\begin{bmatrix} -9 & 0 & -6 \\ 5 & -4 & -2 \\ -3 & 2 & -1 \\ 1 & -6 & 7 \end{bmatrix} - \begin{bmatrix} 7 & 2 & 0 \\ -1 & 9 & -4 \\ 3 & 7 & 5 \\ 0 & 8 & -1 \end{bmatrix}$

4. Do the following scalar multiplications. (Hint: Just like vectors, to multiply a matrix by a scalar, multiply each entry by the scalar)

a) $2\begin{bmatrix}3 & 5\\ 4 & 2\end{bmatrix}$

b) $6\begin{bmatrix}5 & 3 & 7 & 2\\ 0 & 8 & 1 & 4\end{bmatrix}$

c) $-2\begin{bmatrix}2 & 5\\ 4 & 0\\ 1 & 3\end{bmatrix}$

5. Find 2A + B given, A = $\begin{bmatrix}1 & -4 & 7 & 9\\ -2 & 0 & 9 & 3\end{bmatrix}$ and B = $\begin{bmatrix}-4 & 3 & 0 & -1\\ 1 & -5 & 5 & -2\end{bmatrix}$. This is a _____ _____ of A and B.

6. Compute the products *AB* and *BA* for the following, if possible:

a) $A=\begin{pmatrix}1 & 2\\ 3 & 1\end{pmatrix}, B=\begin{pmatrix}-1 & 4\\ 2 & 0.5\end{pmatrix}$

b) $A=\begin{pmatrix}2 & 3\\ 1 & 2\end{pmatrix}, B=\begin{pmatrix}2 & 0.5 & -1\\ 1 & 3 & 4\end{pmatrix}$

c) $A = \begin{pmatrix} 1 & 2 & 2 & 2 \\ 0 & 4 & 0 & 3 \end{pmatrix}, B = \begin{pmatrix} 1 & 1 \\ 2 & 0 \\ 3 & 4 \end{pmatrix}$

7. Given that $A = \begin{pmatrix} 2 & -1 \\ 1 & 0 \end{pmatrix}, B = \begin{pmatrix} 2 & 4 \\ 2 & 3 \end{pmatrix}$ and $C = \begin{pmatrix} 1 & 0 \\ 0 & 3 \end{pmatrix}$, find

a) $A(B + C)$

b) $AB + AC$

c) $(B + C)A$

d) $BA + CA$

8. Solve these systems of equations using row operations on matrices. Remember that you can write the equations in matrix form. If you don't remember how to do this, here's an article that explains how: http://www.sparknotes.com/math/algebra2/matrices/section4.rhtml

a) $-3x + 4y = 12$
$3x - 6y = 18$

b) $-2x + 4y = -20$
$5x - 4y = 32$

c) $4x + 2y = 28$
$4x - 3y = 18$

d) $-3x + 5y = -11$
$3x + 7y = -1$