Problem Set #2

ECON 407: Mathematical Economics

(**due next class**)

1. Write the following linear equation system as a set of matrices $Ax=d$.

$$2x\_{1}-3x\_{2}+9x\_{3}=10$$

$$-x\_{2}+x\_{3}=0$$

$$7x\_{1}+2x\_{2}+8x\_{3}=4$$

2. We said in class that a linear equation system can generally be written as $Ax=d$, where $A$ is the coefficient matrix, $x$ is the variable matrix, and $d$ is the constant matrix. Using the matrices you produced in question #1, verify that this is true. That is, recover the original three equation linear system in question #1 by multiplying $Ax$ and setting the resulting terms equal to $d$ (**show all steps for credit**).

3. Find the sum or difference of the following matrices.

a) $A=\left[\begin{matrix}9&4\\2&7\\3&5\\8&6\end{matrix}\right] B=\left[\begin{matrix}1&3\\6&5\\2&8\\9&2\end{matrix}\right] ; find A+B$

b) $A=\left[\begin{matrix}3&6\\0&1\end{matrix}\right] B=\left[\begin{matrix}4&1&6\\0&2&3\end{matrix}\right] ; find A-B$

4. An electronics store discounts all its items by 20% at the end of the year. If $V\_{1}$ is the value of stock in its three branches prior to the discount, find the value $V\_{2}$ after the discount, when

$$V\_{1}=\left[\begin{matrix}5000&4500&6000\\10000&12000&7500\\8000&9000&11000\end{matrix}\right]$$

5. For each of the following, (i) determine if $AB$ is defined; (ii) indicate what the dimensions of the product matrix will be; (iii) find the product matrix $AB$.

a) $A=\left[\begin{matrix}12&14\\20&5\end{matrix}\right] B=\left[\begin{matrix}3&9\\0&2\end{matrix}\right]$

b) $A=\left[\begin{matrix}5\\1\\10\end{matrix}\right] B=\left[\begin{matrix}3&9&4\\1&2&8\\7&6&0\end{matrix}\right]$

c) $A=\left[\begin{matrix}9&6&2&0&-5\end{matrix}\right] B=\left[\begin{matrix}2\\13\\5\\8\\1\end{matrix}\right]$

d) $A=\left[\begin{matrix}6&2&5\\7&9&4\end{matrix}\right] B=\left[\begin{matrix}10&1\\11&3\\2&9\end{matrix}\right]$