University of Guyana
Faculty of Technology

EMT 121 - Problem Set V

March 16, 2011

1. For $A = \begin{pmatrix} 0 & -1 & 0 \\ 4 & 0 & 2 \\ 8 & -1 & 7 \end{pmatrix}$, $B = \begin{pmatrix} 2 \\ -3 \\ 1 \end{pmatrix}$

   (a) Find AB and BA (if they are defined)

   (b) Find $2B - AB$

2. A company manufactures tables and chairs at two locations. Matrix C gives the total cost for manufacturing each product in each location.

$$C = \begin{pmatrix} 627 & 681 \\ 135 & 150 \end{pmatrix}$$

   (a) Given that labour accounts for 2/3 of the total cost, determine the matrix L that gives the labour costs for each product in each location. What matrix operation did you use?

   (b) Find the matrix M that gives material costs for each product at each location. (Assume that there are only labour and material costs)

3. A fruit grower raises two crops, which are shipped to three outlets. The number of units of product i that are shipped to outlet j is represented by a_{ij} in the matrix

$$A = \begin{pmatrix} 100 & 75 & 75 \\ 125 & 150 & 100 \end{pmatrix}$$

   The profit on one unit of product i is represented by b_{1i} in the matrix

$$B = \begin{pmatrix} 700 & 1400 \end{pmatrix}$$

   Find the matrix product BA and explain what each entry of this product represents.

4. Find x such that
$$A = \begin{pmatrix} 3 & x \\ -2 & -3 \end{pmatrix}$$
is equal to its own inverse.

5. The following cryptogram was encoded with a 2x2 matrix.
8,21,-15,-10,-13,-13,5,10,5,25,5,19,-1,6,20,40,-18,-18,1,16
The last word of the message is _RON. What is the message?

6. For
$$A = \begin{pmatrix} 2 & -1 & -1 \\ -5 & 2 & 2 \\ 5 & -1 & -2 \end{pmatrix}$$
find A^{-1} .