1. For this problem, consider the 3 matrices below.

$$A = \begin{bmatrix} 3 & 1 & -4 \\ -2 & 2 & 1 \\ 1 & 0 & 2 \end{bmatrix} \qquad B = \begin{bmatrix} 1 & 0 & -1 \\ 3 & -2 & 5 \end{bmatrix} \qquad C = \begin{bmatrix} 7 & 2 \\ 6 & -4 \end{bmatrix}$$

$$B = \left[\begin{array}{rrr} 1 & 0 & -1 \\ 3 & -2 & 5 \end{array} \right]$$

$$C = \left[\begin{array}{cc} 7 & 2 \\ 6 & -4 \end{array} \right]$$

a) Of the 6 potential products AB, BA, BC, CB, AG and CA only 2 are possible. State which 2, and then do the actual multiplication. [4 each]

$$#1 BA$$

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

$$\begin{bmatrix} 13 & -4 & \overline{3} \\ -6 & 8 & -26 \end{bmatrix}$$

c) Can any of the 3 matrices A,B or C be added together? NO Explain your answer below. [2] dimensions they do not have same

b) if you were allowed to transpose exactly ONE of the matrices above, state a different product that would be possible, using proper notation. No need to actually do the multiplication. [2]

BTC answer:

2. Represent the following system of equations using matrices. Then solve the system using matrices, clearly showing your use of an inverse matrix. [5]

$$7x + 2y = 3$$

 $6x - 4y = 14$

$$\begin{bmatrix} 7 & 2 \\ 6 & -4 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 14 \end{bmatrix}$$

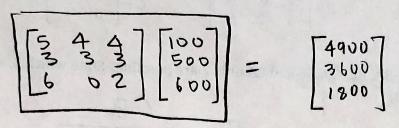
$$det(A)$$

$$= -40$$
 $inv(A)$

Answer: (1,-2)

$$\begin{bmatrix} 1 \\ -2 \end{bmatrix} = \begin{bmatrix} \times \\ y \end{bmatrix}$$

3. Insureco has three traveling insurance salespeople: Ally, Bob and Carlos. They sell 3 different types insurance, Travel, Life, and Home. Travel insurance costs \$100, Life insurance costs \$500 and Health insurance costs \$600. Ally sold 5 Travel, 4 Life, and 4 Health last week. Bob sold 3/3/3 respectively. Carlos sold 6/0/2 respectively. Create two matrices, one of which is a 3x3, that when multiplied together (show order), would yield a 3 x 1 matrix consisting of each salesperson's total sales in \$ last week. [4]



4. Solve the system using Gauss-Jordan Elimination clearly showing and labeling each step. (6 pts)

$$\begin{cases} x+y-z=6 \\ x+z=1 \\ -2y-3z=4 \end{cases} \qquad \begin{bmatrix} 1 & 1 & -1 & | & 6 \\ 1 & 0 & 1 & | & 1 \\ 0 & -2 & -3 & | & 4 \end{bmatrix}$$

$$R_1 \Rightarrow R_1 - R_2$$

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

$$R_1 \Rightarrow 2 \cdot R_1$$

$$\begin{bmatrix} 0 & 2 & -4 & | & 1 \\ 0 & -2 & -3 & | & 4 \end{bmatrix}$$

$$R_3 \Rightarrow R_1 + R_3$$

$$\begin{bmatrix} 0 & 2 & -4 & | & 1 \\ 0 & 0 & -7 & | & 1 \\ 0 & 0 & 1 & | & -2 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 2 & -4 & | & 1 \\ 0 & 0 & 1 & | & -2 \end{bmatrix}$$

$$R_{1} \Rightarrow R_{1} + 4R_{3}$$

$$\begin{bmatrix} 2 & 0 & 1 & 2 & 1 \\ 2 & 1 & 1 & 2 \\ 2 & 0 & 1 & 1 & 2 \\ 2 & 0 & 0 & 1 & 2 \\ 2$$