ANSWERS TO SELECTED PROBLEMS FROM HOMEWORK 2

(ALL PROBLEMS COME FROM SECTION 1.3)

WE HAVE $A - B = 8$, $B + C = 1$, $3D + C = 7$, $2A - 4D = 6$

$$\begin{bmatrix} 1 & -1 & 0 & 0 & 8 \\ 0 & 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 3 & 7 \\ 2 & 0 & 0 & -4 & 6 \end{bmatrix} \xrightarrow[\text{FROM } ④]{\text{SUB } 2 ①} \begin{bmatrix} 1 & -1 & 0 & 0 & 8 \\ 0 & 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 3 & 7 \\ 0 & 2 & 0 & -4 & -10 \end{bmatrix}$$

$$\xrightarrow[\text{FROM } ④]{\text{SUB } 2 ②} \begin{bmatrix} 1 & -1 & 0 & 0 & 8 \\ 0 & 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 3 & 7 \\ 0 & 0 & -2 & -4 & -12 \end{bmatrix} \xrightarrow[\text{TO } ④]{\text{ADD } 2 ③} \begin{bmatrix} 1 & -1 & 0 & 0 & 8 \\ 0 & 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 3 & 7 \\ 0 & 0 & 0 & 2 & 2 \end{bmatrix}$$

SOLVE BY BACK-SUBSTITUTION, $D = 1 \Rightarrow C = 4 \Rightarrow B = -3 \Rightarrow A = 5$

A) $[3 \ -2 \ 7] B = [67 \ 41 \ 41]$

B) $[0 \ 4 \ 9] B = [63 \ 67 \ 57]$

c) $A \begin{bmatrix} -2 \\ 1 \\ 7 \end{bmatrix} = \begin{bmatrix} 41 \\ 21 \\ 67 \end{bmatrix}$ 　　　　 d) $B \begin{bmatrix} 3 \\ 6 \\ 0 \end{bmatrix} = \begin{bmatrix} 6 \\ 6 \\ 63 \end{bmatrix}$

E) $[0 \ 4 \ 9] A = [24 \ 56 \ 97]$ 　　　 F) $A \begin{bmatrix} 7 \\ 4 \\ 9 \end{bmatrix} = \begin{bmatrix} 76 \\ 98 \\ 97 \end{bmatrix}$

⑫ A) ASSUME THAT A IS $N \times M$ AND B IS $S \times T$.
　　 AB DEFINED $\Rightarrow M = S$, BA DEFINED $\Rightarrow N = T$.
　　 THUS AB IS $N \times T$ (I.E. $N \times N$) AND BA IS $S \times M$ (I.E. $M \times M$).
　　 SO AB AND BA ARE SQUARE MATRICES.