Applied Mathematics I
Worksheet #3

September 8, 1997- Professor Broughton

Name:_____ Box #:_____

1. Matrix operations

1. Let A; B and C be the following matices.

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 7 \\ 3 & 0 & 5 \end{bmatrix}$$

$$B = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 0 & 2 \end{bmatrix}$$

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

Solve the following problems.

1.1 Find $2B - 3C$.

1.2 Find $A(B + C)$ and $AB + AC$:

1.3 $(B + C)^T$ and $B^T + C^T$

1.4 $(AB)^T$ and $B^T A^T$:

1.5 Comment about the relation between the computed matrices in each of the last three problems.

2. Let $X_1 = \begin{bmatrix} 2 \\ 1 \\ 3 \end{bmatrix}$; $X_2 = \begin{bmatrix} 2 \\ 2 \\ 1 \\ 0 \end{bmatrix}$, so that $A = [X_1; X_2]$:

2.1 Compute $X_1 \cdot X_1$; $X_1 \cdot X_2$; $X_2 \cdot X_1$; and $X_2 \cdot X_2$:

2.2 Compute $A^t A$

2.3 Comment on the above two calculations

3. Prove or disprove. For 2×2 matrices $AB = BA$: