Math 2418 Linear Algebra Quiz #2
Sept. 5-6, 2001

[8] 1.) Let $A = \begin{bmatrix} 1 & -1 & 4 \\ 0 & -2 & 0 \\ 2 & 5 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 3 & 1 & 5 \\ 2 & 0 & 1 \end{bmatrix}$, $C = \begin{bmatrix} 10 & 30 & 50 \\ 20 & 40 & 60 \end{bmatrix}$

Compute the following if possible. If it not possible, state so.

$(3 \times 3)(2 \times 3)$ not possible

1a.) $AB - 5C = \underline{not\ possible}$

$(2 \times 3)(3 \times 3) = 2 \times 3$

$BA = \begin{bmatrix} 3 & 1 & 5 \\ 2 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & -1 & 4 \\ 0 & -2 & 0 \\ 2 & 5 & 1 \end{bmatrix} = \begin{bmatrix} 3(1)+1(0)+5(2) & 3(-1)+1(-2)+5(5) & 3(4)+1(0)+5(1) \\ 2(1)+0(0)+1(2) & 2(-1)+0(-2)+1(5) & 2(4)+0(0)+1(1) \end{bmatrix}$

$= \begin{bmatrix} 13 & 20 & 17 \\ 4 & 3 & 9 \end{bmatrix}$

$5C = 5\begin{bmatrix} 10 & 30 & 50 \\ 20 & 40 & 60 \end{bmatrix} = \begin{bmatrix} 50 & 150 & 250 \\ 100 & 200 & 300 \end{bmatrix}$

$BA - 5C = \begin{bmatrix} 13 & 20 & 17 \\ 4 & 3 & 9 \end{bmatrix} - \begin{bmatrix} 50 & 150 & 250 \\ 100 & 200 & 300 \end{bmatrix} = \begin{bmatrix} 13-50 & 20-150 & 17-250 \\ 4-100 & 3-200 & 9-300 \end{bmatrix}$

$= \begin{bmatrix} -37 & -130 & -233 \\ -96 & -197 & -291 \end{bmatrix}$

1b.) $BA - 5C = \underline{\begin{bmatrix} -37 & -130 & -233 \\ -96 & -197 & -291 \end{bmatrix}}$

2.) Determine if the system of equations corresponding to the following augmented matrices has no solution, exactly one solution, or an infinite number of solutions. If it has an infinite number of solutions, state the number of free variables.

[4] 2b.) $\begin{bmatrix} 2 & 3 & 4 & 5 & 6 \\ 0 & 7 & 8 & 9 & 0 \\ 0 & 0 & 0 & 0 & 3 \end{bmatrix}$ Answer 2b.)$\underline{no\ solution}$

[4] 2c.) $\begin{bmatrix} 2 & 3 & 4 & 5 & 6 & 7 \\ 0 & 0 & 8 & 9 & 0 & 0 \\ 0 & 0 & 0 & 2 & 0 & 0 \end{bmatrix}$ Answer 2c.)$\underline{infinite\ \#\ sol'ns, 2\ free\ variables}$

[4] 2c.) $\begin{bmatrix} 2 & 3 & 4 & 5 \\ 0 & 6 & 7 & 8 \\ 0 & 0 & 9 & 0 \end{bmatrix}$ Answer 2c.)$\underline{exactly\ one\ sol'n}$