Math 544 Summer 2001 Exam 1 (13)

PRINT Your Name:_____

There are 10 problems on 5 pages. Each problem is worth 5 points. SHOW your work. *CIRCLE* your answer. **CHECK** your answer whenever possible. **No Calculators.**

1. Compute $\begin{bmatrix} 1 & 0 & -1 \\ 2 & 1 & 0 \end{bmatrix} \begin{bmatrix} 2 & 3 \\ 4 & 5 \\ 6 & 7 \end{bmatrix}$.

$= \begin{bmatrix} 2-6 & 3-7 \\ 4+4 & 6+5 \end{bmatrix} = \begin{bmatrix} -4 & -4 \\ 8 & 11 \end{bmatrix}$

2. Express $v = \begin{bmatrix} 5 \\ 7 \\ 5 \end{bmatrix}$ as a linear combination of $v_1 = \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}$ and $v_2 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$, if possible.

Solve $\left[\begin{array}{cc|c} 1 & 1 & 5 \\ 2 & 1 & 7 \\ 1 & 1 & 5 \end{array}\right]$ $R2 \mapsto R2 - 2R1$, $R3 \mapsto R3 - R1$ $\left[\begin{array}{cc|c} 1 & 1 & 5 \\ 0 & -1 & -3 \\ 0 & 0 & 0 \end{array}\right]$ $R1 \mapsto R1 + R2$ $\left[\begin{array}{cc|c} 1 & 0 & 2 \\ 0 & -1 & -3 \\ 0 & 0 & 0 \end{array}\right]$ $R2 \mapsto -R2$ $\left[\begin{array}{cc|c} 1 & 0 & 2 \\ 0 & 1 & 3 \\ 0 & 0 & 0 \end{array}\right]$

So $\begin{bmatrix} 5 \\ 7 \\ 5 \end{bmatrix} = 2\begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix} + 3\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$