

TEST ONE, MA 305, DR. JING'S SECTION  
SEPTEMBER 13, 2005. 3:00-4:15PM

**Print Your Name:**

**Signature**

1. (15 pts) Solve the following linear system.

$$\begin{aligned}x_1 - x_2 + 2x_3 &= -4 \\2x_1 + 3x_2 - x_3 &= 7 \\3x_1 + x_2 - 2x_3 &= -4\end{aligned}$$

2. (25 pts) (a) Compute  $A^{-1}$  for the matrix (if it exists)

$$A = \begin{bmatrix} 1 & 3 & 1 \\ 2 & 1 & 1 \\ -2 & 2 & -1 \end{bmatrix}$$

(b) Compute  $\text{adj}(A)$ .

(c) Solve the system  $Ax = B$ , where  $B = [1, 1, 1]^T$ .

3. (20 pts) Find the LU decomposition for the matrix (if it exists)

$$A = \begin{bmatrix} 2 & 1 & 2 \\ -4 & 2 & -5 \\ 6 & 11 & 4 \end{bmatrix}$$

4. (20 pts) Compute the determinant for the following matrix

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

5. (20 pts) For what values of  $k$  does the system have a unique solution, infinitely many solution or no solutions?

$$\begin{aligned}3x - 2y &= 1 \\6x + ky &= 2\end{aligned}$$