TEST ONE, MA 305, DR. JING'S SECTION
SEPTEMBER 21, 2006. 3:00-4:15PM

Print Your Name: **Signature** **Row**

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

$$\begin{aligned} 3x_1 - 2x_2 - x_3 &= 7 \\ 2x_1 + x_2 - 3x_3 &= -14 \\ x_1 + 2x_2 + x_3 &= 1 \end{aligned}$$

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

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

(a) Compute $adj(A)$.
(b) Solve the system $Ax = B$, where $B = [t, 1, -t]^T$ for each t.

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

$$A = \begin{bmatrix} -2 & -3 & 0 \\ -8 & -21 & -18 \\ -12 & -30 & -23 \end{bmatrix}$$

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

$$\begin{bmatrix} 1 & 1 & 1 \\ x & 3 & y \\ x^2 & 9 & y^2 \end{bmatrix}$$

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

$$\begin{aligned} x - 2y + z &= 1 \\ 3x + ay - z &= 2 \\ 2x - 4y + 5z &= 3 \\ 2x - y + z &= 4 \end{aligned}$$