Name : _____

Homework #3

Math 301, Spring 2013

Due Wednesday, Feb 13, 2013

These homework problems are to be turned in and graded for credit. Turn in your work on separate pages, using this as a cover sheet, and please staple your work together.

1. Reduce this system to upper triangular form by two row operations:

$$\begin{aligned} 2x + 3y + z &= 10 \\ 4x + 7y + 5z &= 2 \\ -2y + 2z &= 0 \end{aligned}$$

   Circle the pivots, and identify the multipiliers ℓ_{21}, ℓ_{31} and ℓ_{23}. Solve the system by back substitution.

2. Apply elimination to the 3×4 augmented matrix $[A\ \mathbf{b}]$. For what value of c does the system have a solution?

$$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 4 & 7 & 12 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ c \end{bmatrix}$$

3. Choose numbers a, b, c and d in this augmented matrix so that thre is (a) no solution, (b) inifinitely many solutions.

$$[A\ \mathbf{b}] = \begin{bmatrix} 2 & 1 & 3 & a \\ 0 & 5 & 7 & b \\ 0 & 0 & d & c \end{bmatrix}$$

   Which of the numbers a, b, c or d have no effect on the solvability? Show all of your work.

4. Find an example of two different 3×3 matrices A and B for which $(A - B)^2$ is equal to $A^2 - 2AB + B^2$.