

Name : \_\_\_\_\_

## Quiz #1 (redo!)

Math 301, Spring 2013

Wednesday, April 1, 2013

You may use notes, and work in groups on this assignment. Please

1. Given the matrix  $A$  below, and an echelon form of  $A$ , find a basis for the column space of  $A$ , and a basis for the nullspace of  $A$ .

$$A = \begin{bmatrix} 3 & -6 & 9 & 0 \\ 2 & -4 & 7 & 2 \\ 3 & -6 & 6 & -6 \end{bmatrix} \sim \begin{bmatrix} 1 & -2 & 5 & 4 \\ 0 & 0 & 3 & 6 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

2. Let

$$A = \begin{bmatrix} 1 & -1 & 5 \\ 2 & 0 & 7 \\ -3 & -5 & -3 \end{bmatrix} \quad \text{and} \quad \mathbf{u} = \begin{bmatrix} -7 \\ 3 \\ 2 \end{bmatrix}.$$

Is  $\mathbf{u}$  in the null space of  $A$ ? Is  $\mathbf{u}$  in the column space of  $A$ ? Justify your answers.

3. Find conditions on  $b_1$ ,  $b_2$ ,  $b_3$ , and  $b_4$  that make the following system solvable. Use this information to find the left nullspace of the matrix  $A$ .

$$\begin{bmatrix} 1 & 2 \\ 2 & 4 \\ 2 & 5 \\ 3 & 9 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \end{bmatrix}$$