Math 214 Spring 2006 **SHOW ALL YOUR WORK** **BONUS** Quiz 6

Math 214, Fall 2003 Final Exam, Question 8.

Given $A = \begin{bmatrix} 1 & 5 & 3 & 1 & 0 \\ -1 & -3 & 0 & 0 & 2 \\ 3 & -3 & 1 & -6 & 1 \\ 2 & -4 & -1 & -5 & 0 \end{bmatrix}$ with $\text{rref}(A) = R = \begin{bmatrix} 1 & 0 & 0 & -1.5 & -0.5 \\ 0 & 1 & 0 & 0.5 & -0.5 \\ 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

Fill in the blanks.

a. The rank of the matrix A is 3

b. null(A) is a subspace of $\mathbb{R}^5$

c. The dimension of col(A) is 3

d. How many vectors are there in a basis of row(A)? 3

e. row(A) is a subspace of $\mathbb{R}^5$.

f. null(A) is spanned by the vectors $\begin{pmatrix} 1.5 \\ -0.5 \\ 0 \\ 1 \\ 0 \end{pmatrix}, \begin{pmatrix} +1/2 \\ 1/2 \\ -1 \\ 0 \\ 1 \end{pmatrix}$

g. The span of the columns of R is all of $\mathbb{R}^3$ **TRUE** or **FALSE** (circle one).

It is a 3-D object (subspace) in $\mathbb{R}^4$, This is <u>NOT</u> the same thing as "all of $\mathbb{R}^3$"

h. $A\vec{x} = \vec{b}$ will be solvable for any $\vec{b} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ 0 \end{bmatrix}$. **TRUE** or **FALSE** (circle one).

This describes col(A). $\vec{b} \in$ col(A) $\Leftrightarrow A\vec{x} = \vec{b}$ has unique soln

i. An example of a basis for col(A) is $\begin{pmatrix} 1 \\ -1 \\ 3 \\ 2 \end{pmatrix}, \begin{pmatrix} 5 \\ -3 \\ -3 \\ -4 \end{pmatrix}, \begin{pmatrix} 3 \\ 0 \\ 1 \\ -1 \end{pmatrix}$