# Math 214 Spring 2008

## BONUS QUIZ 4 *Linear Systems*

**Name**: ________________________________

Date: ______________________ **Friday March 7**

Ron Buckmire

## Topic : Rank, Independence, Dimension and Basis

The idea behind this quiz is to provide you with an opportunity to illustrate your understanding of rank, span, independence and basis.

## Reality Check:

EXPECTED SCORE : __________**/10** ACTUAL SCORE : __________**/10**

## Instructions:

1. Please look for a hint on this quiz posted to `faculty.oxy.edu/ron/math/214/08/`
2. You may use the book or any of your class notes. You must work alone.
3. If you use your own paper, please staple it to the quiz before coming to class. If you don't have a stapler, buy one. **NO UNSTAPLED QUIZZES WILL BE ACCEPTED.**
4. After completing the quiz, sign the pledge below stating on your honor that you have adhered to these rules.
5. Your solutions must have enough details such that an impartial observer can read your work and determine HOW you came up with your solution.
6. Relax and enjoy...
7. **This quiz is due on Monday March 17**, in class. NO LATE QUIZZES WILL BE ACCEPTED.

**Pledge:** I, ______________________, pledge my honor as a human being and Occidental student, that I have followed all the rules above to the letter and in spirit.

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**. Write in explanations in the gaps between questions.

**a.** col($A$) is a subspace of ________________________.

**b.** The rank of the matrix $A$ is ________________________.

**c.** null($A$) is a subspace of ________________________.

**d.** The dimension of col($A$) is ________________________.

**e.** There are ________________________ vectors in a basis of row($A$).

**f.** row($A$) is a subspace of ________________________.

**g.** null($A$) is spanned by the vectors ________________________

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

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

**j.** An example of a basis for col($A$) is ________________________.