Math 214 Spring 2008 **SHOW ALL YOUR WORK** Quiz Five

1. TRUE or FALSE – put your answer in the box (1 point). To receive FULL credit, you must also give a brief, and correct, explanation in support of your answer! Remember if you think a statement is TRUE you must prove it is ALWAYS true. If you think a statement is FALSE then all you have to do is show there exists a counterexample which proves the statement is FALSE at least once.

(a) **TRUE or FALSE?** "A 4×4 matrix with a row of zeros is not invertible."

TRUE

If a 4x4 matrix has a row of zeros then its rref will also have a row of zeros, Thus $\text{rref}(A) \neq I$.

(b) **TRUE or FALSE?** "A matrix with 1's down the main diagonal is invertible."

FALSE

$A = \begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$ $\text{rref}(A) = \begin{pmatrix} 1 & 1 \\ 0 & 0 \end{pmatrix}$

A is not invertible since $\text{rref}(A) \neq I$.

(c) **TRUE or FALSE?** "If A is invertible, then A^{-1} is invertible."

TRUE

If A is invertible, A^{-1} exists. $(A^{-1})^{-1} = A$, so A^{-1} is invertible also.