MAS 3105 June 8, 2006
Quiz 5 Key Prof. S. Hudson

1) Answer TRUE or FALSE:

a) If A and B are row equivalent, then Col(A^T)=Col(B^T).

b) If A is similar to a nonsingular matrix, then A is nonsingular.

c) If A is similar to I, then $A = I$.

d) If A and B are row equivalent they have the same rank.

e) If A represents $L : R^3 \to R^2$ then Col $(A) = L(R^3)$.

2) Find the transition matrix representing the change in coordinates from [1,x] to [2x-1,2x+1] in P_2.

3) Choose ONE of these.

a) Suppose A and B are nxn and B is nonsingular. Prove that rank (BA) = rank (A). [Hint: compare their nullspaces]

b) Suppose that $L : V \to W$ is linear and S is a subspace of V. Prove that $L(S)$ is a subspace of W.

c) The dimension of Col (A) equals the dimension of Row (A). [Explain each step, including a couple of sentences about dependency relations].

Remarks and Answers: The average was about 45/60.

1) TTTTT

2) The matrix U that goes back to the standard basis is easier to do 1st; then find its inverse any way you choose (I used the adjoint method).

$$U = \begin{pmatrix} -1 & 1 \\ 2 & 2 \end{pmatrix} \text{ so, the answer is } U^{-1} = \frac{1}{-4} \begin{pmatrix} 2 & -1 \\ -2 & -1 \end{pmatrix}$$

3) See text.