

GEORGIA TECH

SCHOOL OF MATHEMATICS

MATH 1502

CALCULUS II
Quiz # 11
November 19th 2007

First Name : -----

Last Name : -----

Section & TA's name : -----

1. Find a basis for $\text{Im}(A)$ and $\text{Ker}(A)$ for
(Use the back page for row reduction)

$$A = \begin{bmatrix} 1 & 1 & 0 & 1 \\ 4 & 2 & 6 & 0 \\ 4 & 3 & 1 & 2 \\ 1 & 2 & 0 & 3 \end{bmatrix}$$

$\text{Im}(A)$:

$\text{Ker}(A)$:

Use this page to row reduce A

2. Let $\mathbf{v}_1 = \begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix}$, $\mathbf{v}_2 = \begin{bmatrix} 0 \\ 1 \\ -1 \end{bmatrix}$, $\mathbf{v}_3 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$. Find numbers t_1, t_2, t_3 (called *coordinates*) such that $\mathbf{b} = \begin{bmatrix} 3 \\ -1 \\ 1 \end{bmatrix}$, can be written as $\mathbf{b} = t_1\mathbf{v}_1 + t_2\mathbf{v}_2 + t_3\mathbf{v}_3$.
(Use the back page for row reduction)

$$t_1 =$$

$$t_2 =$$

$$t_3 =$$

Use this page for row reduction

3. Let S be the subspace in \mathbb{R}^4 spanned by the vector $\mathbf{f} = \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix}$.

Give a necessary and sufficient condition for the vectors $\mathbf{x} = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix}$

to belong to S^\perp .

4. Let A be a matrix. Given the expression of the following subspaces in terms of the transposed matrix A^t :

$$(\text{Im}(A))^\perp =$$

$$(\text{Ker}(A))^\perp =$$