Georgia Tech School of Mathematics
Math 1502

Calculus II, Section K

Quiz # 10

November 12th 2008

20 minutes

First Name : _____

Last Name : _____

1. Let $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 3 & 2 \\ 1 & -1 & 1 \end{bmatrix}$.

   (a) Give a basis for $\mathrm{Im}(A)$

   (Give results here and use the back pages for your calculations)

   (b) Give a basis for $\mathrm{Ker}(A)$

   (Give results here and use the back pages for your calculations)

2. Let S be the set of $\mathbf{x} \in \mathbb{R}^4$ such that $x_1 + 2x_2 - 3x_3 - x_4 = 0$.
   (a) Show that S is a linear space

   (b) Give the dimension of S

   (Give results here and use the back pages for your calculations)

$$\dim(S) \ =$$

3. Let $\mathbf{v}_1 = \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix}$ an $\mathbf{v}_2 = \begin{bmatrix} 0 \\ -1 \\ 1 \\ -1 \end{bmatrix}$. Compute the coordinates of the vector $\mathbf{w}$ in the linear space spanned by $\mathbf{v}_1, \mathbf{v}_2$ such that $\mathbf{w} \cdot \mathbf{v}_1 = 1$ and $\mathbf{w} \cdot \mathbf{v}_2 = -1$.

Hint : use the matrix $A = [\mathbf{v}_1, \mathbf{v}_2]$ to express $\mathbf{w}$, compute $A^t\mathbf{w}$ then answer the question.

(Give results here and use the back pages for your calculations)

$$\mathbf{w} =$$

Use the bottom of this page and the back pages for your calculations

Use this page for your calculations