

GEORGIA TECH

SCHOOL OF MATHEMATICS

MATH 1502

CALCULUS II

Quiz # 8

October 24th 2007

First Name : -----

Last Name : -----

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

1. Give a parametrization of the line passing through the vectors

$$\mathbf{x} = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} \text{ and } \mathbf{y} = \begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix} \text{ in } \mathbb{R}^3.$$

2. What is the **rank** of a system of 4 linear equations with 6 variables that can be written in the following augmented matrix reduced form?

$$\left[\begin{array}{cccccc|c} \bullet & * & * & * & * & * & * \\ 0 & 0 & \bullet & * & * & * & * \\ 0 & 0 & 0 & 0 & \bullet & * & * \\ 0 & 0 & 0 & 0 & 0 & 0 & * \end{array} \right]$$

(Here \bullet corresponds to a nonzero number, while $*$ can be any number, zero or not)

Rank =

3. How many parameters are needed to express the solutions of the system of 4 linear equations with 6 variables that can be written in the following augmented matrix reduced form?

$$\left[\begin{array}{cccccc|c} 1 & 5 & 6 & -1 & -3 & -1 & 0 \\ 0 & 0 & 1 & 0 & 2 & -2 & 0 \\ 0 & 0 & 0 & 0 & 1 & -3 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{array} \right]$$

parameters =

4. Use the Gauss elimination method to solve

$$\begin{array}{rcl} x + y + z + u = 1, & & 2x + y - z + u = 2, \\ -x + y + z - 3u = -9, & & -2x + y + z - 2u = 1. \end{array}$$

$$x = \qquad y = \qquad z = \qquad u =$$

5. Using the augmented matrix technique and Gauss elimination method, compute the inverse of the matrix

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

$$A^{-1} = \begin{bmatrix} & & \\ & & \\ & & \end{bmatrix}$$

