LAST NAME: SOLUTIONS

FIRST NAME: _____

STUDENT NUMBER: _____

QUIZ 1 (A)

DAWSON COLLEGE

201-NYC-05 - Linear Algebra

Instructor: E. Richer

Date: June 12th 2008

Question 1. *(5 marks)*

Determine which of the following matrices are in row echelon form, or in reduced row echelon form:

$$A=\begin{bmatrix}1&0&1\\0&1&3\\0&0&1\end{bmatrix}\quad B=\begin{bmatrix}0&1\\1&0\\0&0\end{bmatrix}\quad C=\begin{bmatrix}1&0&1\\0&1&0\\0&0&0\end{bmatrix}\quad D=\begin{bmatrix}0&0\\0&1\\0&0\end{bmatrix}\quad E=\begin{bmatrix}1&0&1\\0&1&2\end{bmatrix}$$

The following matrix (matrices) is (are) in **row echelon** form: A C E

The following matrix (matrices) is (are) in **reduced row echelon** form: C E

Question 2. *(5 marks)*
Find the solution set of the linear equation $3x-2y+z=-1$

Let $y=s$
$z=t$

$3x = -1+2y-z$
$= -1+2s-t$

$x = -1/3+2/3s-1/3t$

THE SOLUTION set is
$(x,y,z) = (-1/3+2/3s-1/3t, s, t)$ where s,t in $\mathbb{R}$

Question 3. *(5 marks)*
Find the solution set of the system of linear equations whose augmented matrix is given below in row echelon form.

$$\begin{bmatrix} 1 & 0 & 1 & -2 \\ 0 & 1 & 2 & 1 \\ 0 & 0 & 1 & 3 \end{bmatrix}$$

BACK SUBSTITUTION

$x_3 = 3$

$x_2+2x_3 = 1$
$x_2 = 1-2x_3$
$= 1-2(3) = -5$

$x_1 + x_3 = -2$
$x_1 = -2-x_3$
$= -2-3 = -5$

THE SOLUTION SET IS
$(x_1, x_2, x_3) = (-5, -5, 3)$

Question 4. *(5 marks)*

Find the solution set of the following system of linear equations.

$x_1 + 2x_3 + x_4 = 0$

$x_3 - x_4 = 0$

AUGMENTED MATRIX IS

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

FREE VARIABLES ARE x_2 & x_4

Let $x_2 = s$

$x_4 = t$

$x_3 - x_4 = 0$

$x_3 = x_4$

$= t$

$x_1 + 2x_3 + x_4 = 0$

$x_1 = -2x_3 - x_4$

$= -2t - t$

$= -3t$

SOLUTION SET IS

$(x_1, x_2, x_3, x_4) = (-3t, s, t, t)$

WHERE s, t in $\mathbb{R}$.