LAST NAME: SOLUTIONS

FIRST NAME: _____

STUDENT NUMBER: _____

QUIZ 1 (B)

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:

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

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

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

Question 2. *(5 marks)*
Find the solution set of the linear equation $2x - 2y + 3z = 4$

Let $y = s$
$z = t$

$2x = 4 + 2y - 3z$
$2x = 4 + 2s - 3t$
$x = 2 + s - \frac{3}{2}t$

THE SOLUTION SET IS
$(x, y, z) = (2 + s - \frac{3}{2}t, s, t)$ $\quad s, t$ 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.

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

$x_3 = -2$
$x_2 - x_3 = 0$
$x_2 = x_3$
$x_2 = -2$

$x_1 + 2x_3 = 3$
$x_1 = 3 - 2x_3$
$= 3 - 2(-2)$
$= 7$

THE SOLUTION SET IS
$(x_1, x_2, x_3) = (7, -2, -2)$

Question 4. *(5 marks)*

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

$x_1 - 2x_3 - x_4 = 0$

$x_3 + 3x_4 = 0$

AUGMENTED MATRIX

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

Free variables x_2 & x_4

Let $x_2 = s$

$x_4 = t$

$x_3 + 3x_4 = 0$

$x_3 = -3x_4$

$= -3t$

$x_1 - 2x_3 - x_4 = 0$

$x_1 = 2x_3 + x_4$

$= 2(-3t) + t$

$= -5t$

SOLUTION SET IS

$(x_1, x_2, x_3, x_4) = (-5t, s, -3t, t)$

s, t in $\mathbb{R}$