

LAST NAME: SOLUTIONS

FIRST NAME: \_\_\_\_\_

STUDENT NUMBER: \_\_\_\_\_

## QUIZ 1 (B)

DAWSON COLLEGE

201-NYC-05-S2 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:

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

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

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

**Question 2.** (5 marks)

Find the solution set of the linear equation  $2x - 5y + 4z = -6$

$$\text{Let } y = s$$

$$z = t$$

$$2x = -6 + 5y - 4z$$

$$x = -3 + \frac{5}{2}y - 2z$$

$$= -3 + \frac{5}{2}s - 2t$$

SOLUTION set is

$$(x, y, z) = (-3 + \frac{5}{2}s - 2t, s, t) \quad s, t \text{ in } \mathbb{R}$$

**Question 3.** (5 marks)

Find the solution set of the system of linear equations whose augmented matrix is given below in row echelon form.

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

$$x_3 = -3$$

$$x_2 - 2x_3 = 1$$

$$\begin{aligned} x_2 &= 1 + 2x_3 \\ &= 1 + 2(-3) \\ &= -5 \end{aligned}$$

$$x_1 - x_3 = 0$$

$$x_1 = x_3 = -3$$

SOLUTION SET IS

$$(x_1, x_2, x_3) = (-3, -5, -3)$$

**Question 4.** (5 marks)

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

$$x_1 - 2x_3 - x_4 = 0$$

$$x_2 + 3x_4 = 0$$

AUGMENTED MATRIX IS

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

Free variables  $x_3, x_4$

$$\text{Let } x_3 = s$$

$$x_4 = t$$

$$x_2 = -3x_4$$

$$= -3t$$

$$x_1 - 2x_3 - x_4 = 0$$

$$x_1 = 2x_3 + x_4$$

$$= 2s + t$$

SOLUTION set is

$$(x_1, x_2, x_3, x_4) = (2s + t, -3t, s, t)$$

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

