The University of Calgary
Department of Mathematics and Statistics
Math 211 L06 Fall 2008 Friday Lab (Sept 26, 2008)
Quiz # 1 Duration: 40 minutes
[marks] Total marks = 30

Name:_____I.D.#:_____

1. Consider the following system of linear equations where $a, b \in \mathbb{R}$:

$$\begin{cases} a\,x + by = 1 \\ x + y = a \end{cases}$$

[2] (a) Write down the coefficient and augmented matrices of the system.

[6](b) Find all values of a and b (i.e., conditions on a and b) such that the system has no solution, exactly one solution or infinitely many solutions.

2. Let A be the following 3×4 matrix:

$$A = \begin{bmatrix} 4 & -1 & 2 & 15 \\ 2 & -1 & 1 & 8 \\ -1 & 2 & -1 & -7 \end{bmatrix}.$$

[6] (a) Carry the matrix A to a (not necessarily reduced) row-echelon form.

[2] (b) What is the rank of A?

[**4**] (c) Use the row-echelon matrix from part (a) to solve the following system:

$$\begin{cases} 4x - y + 2z = 15 \\ 2x - y + z = 8 \\ -x + 2y - z = -7 \end{cases}.$$

3. **[10]** Bring the following matrix to its reduced row-echelon form:

$$B = \begin{bmatrix} 1 & 3 & 3 & 9 & 2 \\ -2 & 2 & 5 & 6 & 1 \\ 4 & 1 & -3 & 3 & 1 \\ 8 & -1 & -10 & -3 & 0 \end{bmatrix}$$