MATH 1300 – D01 – Assignment 1

Due 2009-09-24 at 23:59

Student number: _____

Surname: _____

First name: _____

_____

Answer the following questions on separate sheets. Please show your work. Unclear answers **will not** get full marks.

_____

1. Write the augmented matrix corresponding to the following system [5]

$$
\begin{array}{rrrrl}
2x_1 & +3x_2 & -2x_3 & +x_4 & = 2 \\
3x_1 & & -x_3 & +4x_4 & = 3 \\
-2x_1 & +2x_2 & -x_3 & -x_4 & = 0 \\
x_1 & +x_2 & +x_3 & +x_4 & = 2
\end{array}
$$

2. State whether the following matrices are in row-echelon form (REF), reduced row-echelon form (RREF), both or neither. [10]

$(a) \begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix}, \qquad (b) \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}, \qquad (c) \begin{bmatrix} 1 & 1 & 4 \\ 0 & 0 & 1 \end{bmatrix} \qquad (d) \begin{bmatrix} 1 & 1 & -1 \\ 0 & 0 & 0 \end{bmatrix}$

3. Consider the system [10]

$$
\begin{aligned}
x + ay &= b \\
x - y &= 2,
\end{aligned}
$$

where $a, b \in \mathbb{R}$. Write the augmented matrix corresponding to the system. Solve the system by substitution and by elimination. Find values of a, b such that the system has a) no solution, b) a unique solution and c) infinitely many solutions; plot the situation in each of these cases.