Math1204 Test 1 2015

January 14$^{\text{th}}$, 2015

Answer all questions and give complete reasons and checks for your answers. Please do not erase anything, just put a line through your work and continue; you cannot lose marks for anything you write. The parts of the questions are weighted as shown and can be answered in any order.

1. (a) Find all solutions to this system of equations by using row operations. [8]

$$\begin{array}{rcl} 7\,w + 3\,x + 5\,y & = & 11 \\ 6\,w - x - 2\,y + 5\,z & = & -1 \\ -3\,w - 3\,x + y - 2\,z & = & 7 \end{array}$$

(b) Check whether your answers are correct and use them to explain how many of w, x, y and z can be positive at once while satisfying all of the equations. [2]

2. Find the unique solution to this matrix equation using row operations and check your solution via matrix multiplication. [8]

$$\left(\begin{array}{ccc|c} 6 & 6 & 7 & 0 \\ 7 & 2 & 3 & 6 \\ 6 & 5 & 6 & 1 \end{array} \right)$$

3. Given $C := \begin{pmatrix} 3 & 1 \\ -2 & 0 \end{pmatrix}$ find a matrix B without any 0s in such that $BC = CB$, by using algebra, investigation or knowledge of matrix multiplication, explaining how. [2]