Math115 2011 Test 1

January 19$^{\text{th}}$, 2011

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 writing it as a matrix and reducing it to an equivalent of reduced row echelon form. [9]

$$
\begin{aligned}
7\,w + 4\,x + 4\,y + 5\,z &= 1 \\
6\,w + 2\,x + 3\,y + 4\,z &= 10 \\
4\,w + 2\,x + y + 2\,z &= 2
\end{aligned}
$$

   (b) Check whether your two matrix solutions have their required properties. [2]

2. (a) Show that this system of equations has no solution using row operations: [7]

$$
\left(
\begin{array}{ccc|c}
-3 & -3 & 0 & -2 \\
-4 & -1 & -4 & 1 \\
-1 & 4 & -1 & 3 \\
0 & -1 & 1 & -1
\end{array}
\right)
$$

   (b) Give an example of an augmented matrix (with as few zeroes as possible) of the same size as the above system which will have exactly one solution explaining why. [2]