

# Math1204 Test 1

January 25<sup>th</sup>, 2016

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 a particular solution and the homogeneous solution for this system of equations by using row operations to pivot as many times as possible. [9]

$$\begin{aligned}5w + 2x - 5y + 5z &= 5 \\w + 3x - y + z &= 14 \\-w + 4x - 5y + z &= -1 \\w - 2x + 2y &= 0\end{aligned}$$

- (b) Check your solutions by substitution back into the original equation. What is the rank of the underlying matrix? Give a rank 1 system of equations with no zeros in which has your particular solution as a homogeneous solution. [4]

2. Use row operations on the this matrix representation of a system of equations and produce a row of zeros and hence find its solution which only involves simple fractions. [7]

$$\left( \begin{array}{ccc|c} 7 & 3 & 9 & 5 \\ 3 & 7 & 3 & 4 \\ 3 & 3 & 5 & 9 \\ 3 & 5 & 3 & 2 \end{array} \right)$$

Check your answer using matrix multiplication.