Math1204 Test 1

January 10th, 2018

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) The below matrix represents three equations; use row operations to show that there are an infinite number of solutions to them. Give a general formula for the solutions (which may involve small fractions) and check it. [9]

$$\begin{pmatrix} 5 & 8 & 5 & \vdots & 2 \\ 4 & 7 & 3 & \vdots & 5 \\ 3 & 3 & 6 & \vdots & -9 \end{pmatrix}$$

   (b) Using trial and error on your answer, or otherwise, find an all-integer solution to the system of equations. [1]

2. (a) Identify and use a series of row operations to convert the augmented matrix underlying this system of equations into an equivalent of Reduced Row Echelon Form, and check that your final answer is correct. [8]

$$\begin{aligned} -4\,x - 3\,y + 4\,z &= 5 \\ 4\,x - y - 3\,z &= 8 \\ x + 2\,y - z &= -5 \end{aligned}$$

   (b) Do you believe you used the most efficient series of row operations? If so, explain why, otherwise, give an example of some row operations which would have worked better than your choices. You do not need to redo the whole of part (a). [2]