Math1204 Test 2

February 8$^{\text{th}}$, 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. The parts of the questions are weighted as shown and can be answered in any order.

1. (a) Find the adjoint of $M := \begin{pmatrix} 1 & -1 & 2 \\ 2 & 2 & x \\ 1 & 2 & -1 \end{pmatrix}$, check your working is correct by multiplying your answer on the left of M and identify $\det(M)$. [8]

    (b) Swap two columns of M to make P and evaluate $\det(P)$ by cofactor expansion. Multiply row 3 of M by -1 to make Q and evaluate $\det(Q)$. [2]

    (c) Why would $\det(Q) = \det(P)$ no matter what M was using (b)? What is the rank of $(M - P)$ in general if P is formed from an M in the way described in (b)? [3]

2. Find the integer-only inverse of this matrix N using row operations: [7]

$$N := \begin{pmatrix} 3 & 5 & -1 \\ 1 & 4 & -1 \\ 5 & 2 & 0 \end{pmatrix}$$