

# Math1204 Test 2 2015

January 28<sup>th</sup>, 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) Use a Laplace expansion on  $\begin{pmatrix} 7 & 4 & 2 \\ 12 & 8 & x \\ y & -3 & 6 \end{pmatrix}$  to get its determinant and find which value of  $x$  will ensure that this matrix is non-singular for any value for  $y$ . [4]

- (b) Calculate the inverse of the matrix  $E := \begin{pmatrix} 3 & 3 & 2 \\ 3 & 2 & 4 \\ 1 & 0 & 3 \end{pmatrix}$  using row operations. [6]

2. (a) Simplify this expression using the rules of matrix algebra to get  $X$  in terms of the other matrices. Identify what sizes the matrices must be to make a unique answer for  $X$  if  $X$  is an  $m \times n$  matrix. [6]

$$XB + 4C^T = 3X$$

- (b) Use these matrices to find the integer valued matrix  $X$  which satisfies the equation in question 2.(a). [4]

$$B := \begin{pmatrix} 4 & 4 \\ -1 & 7 \end{pmatrix}, \quad C := \begin{pmatrix} 3 & 1 \\ 2 & 8 \end{pmatrix}.$$