

# Math1204 Test 2

January 30<sup>th</sup>, 2017

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 row operations to find the inverse of this matrix and check it using multiplication by  $M$ . [7]

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

- (b) Use  $M^{-1}$  to find  $\mathbf{v}$  if  $M\mathbf{v} = \begin{pmatrix} 4 \\ -4 \\ 3 \end{pmatrix}$ , and evaluate  $M\mathbf{v}$  to check. [3]

2. (a) Evaluate the determinant of this matrix  $A$  and hence find the value of  $y$  for which the  $A$  is guaranteed to be non-singular. [5]

$$A := \begin{pmatrix} 1 & 3 & y \\ 2 & 2 & -5 \\ -4 & x & 2 \end{pmatrix}$$

- (b) Find integer values of  $x$  and  $y$  such that the determinant of  $A$  is 1. [2]
- (c) Create a  $3 \times 3$  matrix  $B$  with no zeroes in and again with one  $x$  and one  $y$ , but this time in the same row or column. Explain why  $B$  cannot be guaranteed to be non-singular for any  $x$  or  $y$ . Find a  $B$  of this form which is guaranteed to be singular no matter what  $x$  or  $y$  is. [3]