

Math115 Test 3

March 4th, 2009

Answer all part of the question and give complete reasons and checks for your answers. The parts of the questions are weighted as shown in square brackets on the right.

1. (a) Find the only eigenvalue and its eigenvector of [6]

$$B := \begin{pmatrix} \frac{-1}{2} & \frac{1}{2} \\ -2 & \frac{-5}{2} \end{pmatrix}$$

- (b) Considering the diagonalisation process for a 2×2 matrix with one eigenvalue of multiplicity 2, use algebra to identify the unique diagonalisable 2×2 matrix which has two distinct eigenvectors which share an eigenvalue e . [3]
2. (a) Use one pair of row and column operations to get one eigenvalue of C and hence get the other two eigenvalues. [5]

$$C := \begin{pmatrix} -23 & -44 & 52 \\ 18 & 31 & -36 \\ 6 & 8 & -9 \end{pmatrix}$$

- (b) Find the eigenvector corresponding to the largest eigenvalue. [6]