

ASSIGNMENT 1, MP204/MP274, 1st Semester 1999

Please hand in this assignment either in the tutorial *to the lecturer*, or *place in the box labelled MP204/274 ASSIGNMENTS*, outside Room 424 Priestley, by 5pm 22nd March.

1. Let A be the following product of 3×3 elementary row matrices:

$$A = E_3(2)E_{12}E_{23}(-1).$$

Find A and A^{-1} by using properties of elementary row matrices. Do not perform matrix multiplications explicitly.

2. Express the non-singular matrix $A = \begin{bmatrix} 2 & 3 \\ 3 & 7 \end{bmatrix}$ as a product of elementary matrices by finding the row reduced echelon form of A .

3. Let $A = \begin{bmatrix} 1 & 1 & 2 & 3 \\ 3 & 4 & 3 & 8 \\ 1 & 3 & -4 & 1 \\ -2 & -1 & -7 & -7 \\ -3 & -4 & -3 & -8 \end{bmatrix}$.

- (a) Find $\text{rref}(A)$.
- (b) Determine the left-to-right basis for $C(A)$ and also find a basis for $R(A)$.
- (c) Solve the system $AX = 0$ and find a basis for $N(A)$.

4. Determine whether the following vectors are linearly dependent or linearly independent:

$$\begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 6 \\ 1 \end{bmatrix}.$$