



LINEAR ALGEBRA

— MA 242 —

Exercise Sheet

3

– not graded –

1 Consider the matrices

$$A = \begin{bmatrix} 1 & 2 \\ 2 & 5 \end{bmatrix}, \quad B = \begin{bmatrix} 3 & 1 \\ 1 & 3 \end{bmatrix}.$$

- (a) Verify that $\det(AB) = \det(A)\det(B)$.
(b) Verify that $\det(A+B) \neq \det(A) + \det(B)$.

2 Compute the determinant of $A = \begin{bmatrix} 2 & -9 & 3 & 5 \\ 0 & \frac{1}{2} & 2 & 7 \\ 0 & 0 & 3 & 1 \\ 0 & 0 & 0 & \frac{1}{3} \end{bmatrix}$.

3 Compute the determinant of $A = \begin{bmatrix} 3 & 0 & 0 \\ 2 & -1 & 1 \\ 1 & 1 & -4 \end{bmatrix}$

- (a) by the rule of Sarrus.
(b) by cofactor expansion.

4 Compute the determinant of $A = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

- (a) by cofactor expansion.
(b) by executing one row operation.