

1. Let $A = \begin{pmatrix} 1 & 2 \\ 3 & -1 \end{pmatrix}$ and $B = \begin{pmatrix} 3 & 0 \\ -2 & 1 \end{pmatrix}$.

Find

(a) $A + B$;

(2)

(b) $-3A$;

(2)

(c) AB .

(3)

(Total 7 marks)

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

(a) Find A^{-1} .

(2)

(b) Solve the matrix equation $AX = \begin{pmatrix} 4 & 6 \\ 2 & -2 \end{pmatrix}$.

(4)

(Total 6 marks)

3. Let $A = \begin{pmatrix} 3 & x \\ -2 & -3 \end{pmatrix}$.

(a) Find the value of x for which A^{-1} does not exist.

(3)

(b) Given that $A = A^{-1}$, find x .

(5)

(Total 8 marks)

4. Let $A = \begin{pmatrix} 1 & -2 \\ 3 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} -5 \\ 5 \end{pmatrix}$.

(a) Find AB .

(3)

(b) Solve $A^{-1}X = B$.

(2)

(Total 5 marks)

5. Let $A = \begin{pmatrix} 5 & 1 \\ 6 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & -1 \\ -6 & 5 \end{pmatrix}$.

(a) (i) Find AB .

(ii) Write down the inverse of A .

(3)

Let $X = \begin{pmatrix} x \\ y \end{pmatrix}$ and $C = \begin{pmatrix} 8 \\ -4 \end{pmatrix}$.

(b) Solve the matrix equation $AX = C$.

(4)

(Total 7 marks)

6. A matrix M has inverse $M^{-1} = \begin{pmatrix} 5 & 0 \\ 1 & 2 \end{pmatrix}$.

(a) Find M .

(3)

(b) Solve the matrix equation $MX = B$, where $B = \begin{pmatrix} 1 \\ 7 \end{pmatrix}$ and $X = \begin{pmatrix} x \\ y \end{pmatrix}$.

(3)

(Total 6 marks)

7. Let $\mathbf{A} = \begin{pmatrix} 1 & -2 \\ 3 & p \end{pmatrix}$ and $\mathbf{B} = \begin{pmatrix} -2 & 1 \\ q & \frac{1}{2} \end{pmatrix}$.

(a) Find \mathbf{AB} in terms of p and q .

(2)

(b) Matrix \mathbf{B} is the inverse of matrix \mathbf{A} . Find the value of p and of q .

(5)

(Total 7 marks)

8. Let $\mathbf{A} = \begin{pmatrix} 1 & -2 \\ 0 & 3 \end{pmatrix}$.

(a) Find \mathbf{A}^2 .

(2)

(b) Let $\mathbf{B} = \begin{pmatrix} -3 & 4 \\ 2 & 1 \end{pmatrix}$. Solve the matrix equation $3\mathbf{X} + \mathbf{A} = \mathbf{B}$.

(3)

(Total 5 marks)