1. If $\begin{pmatrix} 4 & x+2 \\ 2x-3 & x+1 \end{pmatrix}$ is a symmetric, find the value of x.

2. If A is a square matrix such that $A^2 = A$, find $(2+A)^3 - 19A$.

3. For the matrix $A = \begin{pmatrix} 2 & 3 \\ -4 & -6 \end{pmatrix}$, verify the fallowing $A(adjA) = (adjA)A = \left|A\right| I$.

4. Using properties of determinants shows that

$$\begin{vmatrix} 1+a^2-b^2 & 2ab & -2b \\ 2ab & 1-a^2 & 2a \\ 2b & -2a & 1-a^2-b^2 \end{vmatrix} = (1+a^2+b^2)^3$$

5. Find the equation of the line joining $A(1,3)$ and $B(0,0)$ using determinants. Also, find k if $D(k,0)$ is a point such that the area of ΔABD is 3 square units.

6. Solve the system of linear equations using the matrix method:

$$7x + 2y = 11$$
$$4x - 7y = 2$$

7. Find the value of x, if $\begin{pmatrix} x & 1 \end{pmatrix} \begin{pmatrix} 1 & 0 \\ -2 & -1 \end{pmatrix} \begin{pmatrix} x \\ 3 \end{pmatrix} = 0$

8. If $A = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$, then $A^4 =$ ____________.

9. Given $A = \begin{pmatrix} 1 & -1 & 1 \\ 3 & -2 & 1 \\ -2 & 1 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 2 \\ 2 & 4 \\ 1 & -2 \end{pmatrix}$, the order of the matrix AB is ____________.

10. if $A = \begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}$ $(i^2 = -1)$ and $B = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$, then AB is equal to

    (a) $\begin{pmatrix} 0 & i \\ i & 0 \end{pmatrix}$

    (b) $\begin{pmatrix} i & 0 \\ 0 & -i \end{pmatrix}$

    (c) $\begin{pmatrix} i & -i \\ 0 & 1 \end{pmatrix}$

    (d) $\begin{pmatrix} 0 & 0 \\ i & 0 \end{pmatrix}$

11. If A is a $5 \times p$ matrix, B is a $2 \times q$ matrix, then the order of the matrix AB is 5×4. What are the values of p and q?

    (a) $p = 2, q = 4$

(b) $p = 4, q = 2$

(c) $p = 2, q = 2$

(d) $p = 4, q = 4$

12. Value of k, for which $A = \begin{pmatrix} k & 8 \\ 1 & 2k \end{pmatrix}$ is a singular matrix is:

    (a) 4

    (b) -4

    (c) ± 4

    (d) 0

13. If $A = [a_i j]$ is a square matrix of order 2 such that $a_i = \begin{cases} 1, & i+j \\ 0, & i-j \end{cases}$, then A^2 is:

    (a) $\begin{pmatrix} 1 & 0 \\ 1 & 0 \end{pmatrix}$

    (b) $\begin{pmatrix} 1 & 1 \\ 0 & 0 \end{pmatrix}$

    (c) $\begin{pmatrix} 1 & 1 \\ 1 & 0 \end{pmatrix}$

    (d) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$