1. Find whether the following pair of linear equations are consistent or inconsistent:

$$5x - 3y = 11,$$
$$-10x + 6y = 22.$$

2. Solve for x and y:

$$x + y = 6,$$
$$2x - 3y = 4.$$

3. Find out whether the pair of equations $2x + 3y = 0$ and $2x - 3y = 26$ is consistent or inconsistent.

4. For what values of k, does the pair of linear equations $kx - 2y = 3$ and $3x + y = 5$ has a unique solution?

5. What type of lines will you get by drawing the graph of the pair of equations $x - 2y + 3 = 0$ and $2x - 4y = 5$?

6. The sum of the numerator and denominator of a fraction is 18. If the denominator is increased by 2, the fraction is reduced to $\frac{1}{3}$. Find the fraction.

7. Find the value of k for which the system of equations $x + 2y = 5$ and $3x + ky + 15 = 0$ has no solution.

8. If 2 tables and 2 chairs cost ₹ 700, and 4 tables and 3 chairs cost ₹ $1,250$, then find the cost of one table.

9. If the graph of a pair of lines $x - 2y + 3 = 0$ and $2x - 4y = 5$ are drawn, then what type of lines are drawn?

10. If $A = \begin{pmatrix} 1 & -1 \\ -1 & 1 \end{pmatrix}$, then A^2 equals:

    (a) $\begin{pmatrix} 2 & -2 \\ -2 & 2 \end{pmatrix}$

    (b) $\begin{pmatrix} 2 & -2 \\ -2 & -2 \end{pmatrix}$

    (c) $\begin{pmatrix} -2 & -2 \\ -2 & 2 \end{pmatrix}$

    (d) $\begin{pmatrix} -2 & 2 \\ 2 & -2 \end{pmatrix}$

11. $\begin{vmatrix} 43 & 44 & 45 \\ 44 & 45 & 46 \\ 45 & 46 & 47 \end{vmatrix}$

    (a) 0

(b) -1

(c) 1

(d) 2

12. A square matrix A is said to be singular if _____.

13. If $A = \begin{pmatrix} 3 & -5 \\ 2 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 17 \\ 0 & -10 \end{pmatrix}$, then $\left|AB\right| =$ _____.

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

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

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

17. Using properties of determinants shows that

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

18. 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.

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

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

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

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

22. 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 _____.

23. 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) $\begin{pmatrix} 0 & 0 \\ i & 0 \end{pmatrix}$

24. 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) $p = 4, q = 4$

25. 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

26. 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) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

27. Given that A is a square matrix of order 3 and $|A| = -4$, then $|adjA|$ is equal to:

(a) -4

(b) 4

(c) -16

(d) 16

28. If $\begin{pmatrix} 2a + b & a - 2b \\ 5c - d & 4c + 3d \end{pmatrix} = \begin{pmatrix} 4 & -3 \\ 11 & 24 \end{pmatrix}$, then the value of $a + b - c + 2d$ is:

(a) 8

(b) 10

(c) 4

(d) -8

29. Given that matrices A and B are of order $3 \times n$ and $m \times 5$ respectively, then the order of matrix $C = 5A + 3B$ is:

(a) 3×5

(b) 5×3

(c) 3×3

(d) 5×5

30. For matrix $A = \begin{pmatrix} 2 & 5 \\ -11 & 7 \end{pmatrix}$, $(adjA)'$ is equal to:

(a) $\begin{pmatrix} -2 & -5 \\ 11 & -7 \end{pmatrix}$

(b) $\begin{pmatrix} 7 & 5 \\ 11 & 2 \end{pmatrix}$

(c) $\begin{pmatrix} 7 & 11 \\ -5 & 2 \end{pmatrix}$

(d) $\begin{pmatrix} 7 & -5 \\ 11 & 2 \end{pmatrix}$

31. Given that $A = [a_{ij}]$ is a square matrix of order 3×3 and $\left|A\right| = -7$, then the value of $\sum_{i=1}^{3} a_{i2}A_{i2}$,where A_{ij} denotes the co-factor of element a_{ij} is:

(a) 7

(b) -7

(c) 0

(d) 49

32. If $A = \begin{pmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{pmatrix}$, then

(a) $A^{-1} = B$

(b) $A^{-1} = 6B$

(c) $B^{-1} = B$

(d) $B^{-1} = \frac{1}{6}A$

33. Given that A is a non-singular matrix of order 3 such that $A^2 = 2A$, then the value of $\left|2A\right|$ is:

(a) 4

(b) 8
(c) 64
(d) 16

34. If $A = \begin{pmatrix} 0 & 2 \\ 3 & -4 \end{pmatrix}$ and $kA = \begin{pmatrix} 0 & 3a \\ 2b & 24 \end{pmatrix}$, then the values of k, a, and b respectively are:

(a) $-6, -12, -18$
(b) $-6, -4, -9$
(c) $-6, 4, 9$
(d) $-6, 12, 18$

35. If A is a square matrix such $A^2 = A$, then $(I + A)^3 - 7A$ is equal to:

(a) A
(b) $I + A$
(c) $I - A$
(d) I

36. For $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$, then $14A^{-1}$ is given by:

(a) $14\begin{pmatrix} 2 & -1 \\ 1 & 3 \end{pmatrix}$
(b) $\begin{pmatrix} 4 & -2 \\ 2 & 6 \end{pmatrix}$
(c) $2\begin{pmatrix} 2 & -1 \\ 1 & -3 \end{pmatrix}$
(d) $2\begin{pmatrix} -3 & -1 \\ 1 & -2 \end{pmatrix}$

37. Given that $A = \begin{pmatrix} \alpha & \beta \\ \gamma & -\alpha \end{pmatrix}$ and $A^2 = 3I$, then:

(a) $1 + \alpha^2 + \beta\gamma = 0$
(b) $1 - \alpha^2 - \beta\gamma = 0$
(c) $3 - \alpha^2 - \beta\gamma = 0$
(d) $3 + \alpha^2 + \beta\gamma = 0$

38. Let $A = \begin{pmatrix} 1 & \sin\alpha & 1 \\ -\sin\alpha & 1 & \sin\alpha \\ -1 & -\sin\alpha & 1 \end{pmatrix}$, where $0 \leq \alpha \leq 2\pi$, then:

(a) $|A| = 0$
(b) $|A| \in (2, \infty)$
(c) $|A| \in (2, 4)$
(d) $|A| \in |2, 4|$