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 $3x + y = 5$ have 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 the denominator of a fraction is 18. If the denominator is increased by 2, the fraction reduces 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 $2x - 4y = 5$ be drawn, then what type of lines are drawn?

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

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

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

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

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

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 _____.

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

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

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

14. For matrix $A = \begin{bmatrix} 2 & 3 \\ -4 & -6 \end{bmatrix}$, verify the following: $A(adjA) = (adjA)A = |A|I$

15. Using properties of determinants show that

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

16. 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.

17. Solve the system of linear equations, using the matrix method:

$$7x + 2y = 114x - 7 = 2$$

18. Find the Value of x, if $\begin{bmatrix} x & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ -2 & -1 \end{bmatrix} \begin{bmatrix} x \\ 3 \end{bmatrix} = 0$

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

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

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

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

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

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

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

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

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

    (a) 4

    (b) -4

    (c) ± 4

    (d) 0

24. If $A = [a_i j]$ is a square matrix of order 2 such that

$$a_i = \begin{cases} 1,\text{i} + \text{j} \\ 0, i - j \end{cases} \tag{1}$$

    ,then A^2 is:

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

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

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

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

25. 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

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

    (a) 8

    (b) 10

(c) 4

(d) -8

27. 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

28. For matrix $A = \begin{bmatrix} 2 & 5 \\ -11 & 7 \end{bmatrix}$, $(\text{adj}A)'$ is equal to:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(a) 4
(b) 8
(c) 64
(d) 16

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

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

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

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

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

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

35. Given that $A = \begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ 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) $3 + \alpha^2 + \beta\gamma = 0$

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

(a) $\left|A\right| = 0$

(b) $\left|A\right| \in (2, \infty)$

(c) $\left|A\right| \in (2, 4)$

(d) $\left|A\right| \in \left|2, 4\right|$