

INTERNATIONAL INDIAN SCHOOL BURAI DAH

Worksheet for the Academic Year 2026-27

CLASS: 12

SUBJECT: Mathematics

DATE: 26/04/26

LESSON 3 : Matrices & LESSON 4 - Determinants

1. If $\begin{matrix} x - y - z & 0 \\ -z + z & = 5 \\ z & 3 \end{matrix}$, the value of $x + y + z$ is

- [a] 9 b) 2 c) 0 d) 22]

2. $A = \begin{pmatrix} x & 1 \\ 1 & 0 \end{pmatrix}$, if A^2 is an identity matrix, value of x is

- [a] -1 b) 0 c) 1 d) 2]

3. If A is a square matrix, then

- 1) $A + A^T$ is symmetric 2) AA^T is skew-symmetric
 3) $A - A^T$ is symmetric 4) $A^T A$ is skew-symmetric

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

- [a] 4 b) 3 c) -4 d) -3]

5. For what value of x , $\begin{pmatrix} 3 - 2x & x + 1 \\ 2 & 4 \end{pmatrix}$ is singular

- [a] 1 b) -1 c) 2 d) None]

6. If $\begin{bmatrix} x & 1 \\ -2 & 0 \end{bmatrix} \begin{pmatrix} 1 & 0 \\ -2 & 0 \end{pmatrix} = 0$, value of x is

- [a] 0 b) -2 c) -1 d) 2]

7. If $A = \begin{pmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & a \end{pmatrix}$, then $| \text{adj}(A) |$ is

- [a] a^{27} b) a^9 c) a^6 d) a^2]

8. If $A = \begin{pmatrix} 2 & 1 \\ 0 & x \end{pmatrix}$ and $A^{-1} = \begin{pmatrix} \frac{1}{2} & \frac{1}{6} \\ 0 & \frac{1}{x} \end{pmatrix}$, value of x is

- [a] 3 b) -3 c) 2 d) -2]

9. If $A = \begin{pmatrix} 2 - k & 2 \\ 1 & 3 - k \end{pmatrix}$ and if $|A| = 0$, value of $5k - k^2$ is

- [a] -4 b) 6 c) 4 d) -6]

10. If A and B are matrices of order 3 and $|A| = 5$, $|B| = 3$, then $|2AB|$ is

- [a] 100 b) 120 c) 80 d) 150]

11. If A and B are matrices, then $(A+B)^2$ is?

- [a) $A^2+2AB+B^2$ b) $A^2+AB-BA+B^2$
c) $A^2-AB+BA+B^2$ d) $A^2+AB+BA+B^2$]

12. The vertices of a triangle ABC are A (-2, 4), B (2, -6) and C (5, 4). The area is?

- [a) 17.5 b) 36 c) 32 d) 28]

13. Write the value of the determinant $\begin{vmatrix} p & p+1 \\ p-1 & p \end{vmatrix}$.

14. In the interval $\frac{\pi}{2} < x < \pi$, find the value of x for which the matrix $\begin{vmatrix} 2\sin x & 3 \\ 1 & 2\sin x \end{vmatrix}$ is singular.

15. Let A be a square matrix of order 3x3, find the value of $|2A|$, where $|A| = 4$.

16. Write the value of (a) $\Delta = \begin{vmatrix} x+y & y+z & z+x \\ z & x & y \\ -3 & -3 & -3 \end{vmatrix}$ (b) $\Delta = \begin{vmatrix} 2 & 3 & 4 \\ 5 & 6 & 8 \\ 6x & 9x & 12x \end{vmatrix}$

17. If $|A| = 2$, where A is a 2x2 matrix, then find $|\text{adj}A|$.

18. If A is a non-singular matrix of order 3 and $|\text{adj}A| = |A|^k$, then find the value of k.

19. If $A = \begin{pmatrix} 2 & -1 \\ -1 & 2 \end{pmatrix}$ and I is the identity matrix order 2, then show that $A^2 = 4A - 3I$. Hence find A^{-1} .

20. Given $A = \begin{pmatrix} 2 & -3 \\ -4 & 7 \end{pmatrix}$, compute A^{-1} and show that $2A^{-1} = 9I - A$.

21. If $|A| = 3$ and $A^{-1} = \begin{pmatrix} 3 & -1 \\ -5 & 2 \\ 3 & 3 \end{pmatrix}$, then find $\text{adj}A$.

22. Using matrices, solve the following system of linear equations;

- (a) $x + y + z = 6$; (b) $8x + 4y + 3z = 18$ (c) $4x + 3y + 2z = 60$ (d) $2x + 8y + 5z = 5$
 $x + 2z = 7$ $2x + y + z = 5$ $x + 2y + 3z = 45$ $x + y + z = -2$
 $3x + y + z = 12$ $x + 2y + z = 5$ $6x + 2y + 3z = 70$ $x + 2y - z = 2$

23. If $A = \begin{pmatrix} 2 & -1 & 1 \\ 3 & 0 & -1 \\ 2 & 6 & -1 \end{pmatrix}$, then find A^{-1} . Using A^{-1} solve the system of linear equations

$2x - y + z = -3$; $3x - z = 0$; $2x + 6y - z = 2$.

24. If $A = \begin{pmatrix} 1 & -2 & 1 \\ 0 & -1 & 1 \\ 2 & 0 & -3 \end{pmatrix}$, then find A^{-1} and hence solve the system of linear equations

$x - 2y + z = 0$; $-y + x = -2$; $2x - 3z + 10$

25. 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 find AB . Use this to solve the system of equations $x - y = 3$; $2x + 3y + 4z = 17$; $y + z = 7$.

26. If for three matrices $A = [a_{ij}]_{m \times 4}$, $B = [b_{ij}]_{n \times 3}$, and $C = [c_{ij}]_{p \times q}$ the products ANB and AC are defined then the values of m, n, p and q are

i) $m=q=3$ and $n=p=4$

ii) $m=2$, $q=3$ and $n=p=4$

iii) $m=q=4$ and $n=p=3$

iv) $m=4$, $p=2$ and $n=q=3$

27. If the matrix $A = \begin{pmatrix} 0 & r & -2 \\ 3 & p & t \\ q & -4 & 0 \end{pmatrix}$ is skew symmetric then the value of $\frac{q+t}{p+r}$ is

- a) -2 b) 0 c) 1 d) 2

28. If A is a square matrix of order 4 and $|adj A| = 27$., Then $A(adj A) =$

- a) 3 b) 9 c) 3I D) 9I

29. The value of determinant $\begin{vmatrix} \cos 67 & \sin 23 \\ \sin 23 & \cos 67 \end{vmatrix}$ is

- a) 0 b) $\frac{1}{2}$ c) 1 d) $\frac{\sqrt{3}}{2}$

30. $A = \begin{pmatrix} 3 & -6 & -1 \\ 2 & -5 & -1 \\ -2 & 4 & 1 \end{pmatrix}$ AND $B = \begin{pmatrix} 1 & -2 & -1 \\ 0 & -1 & -1 \\ 2 & 0 & 3 \end{pmatrix}$, find the product AB and hence solve the system of equations : $3x-6y-z=3$; $2x-5y-z+2=0$; $x+y+z=6$; $-2x+4y+z=5$;