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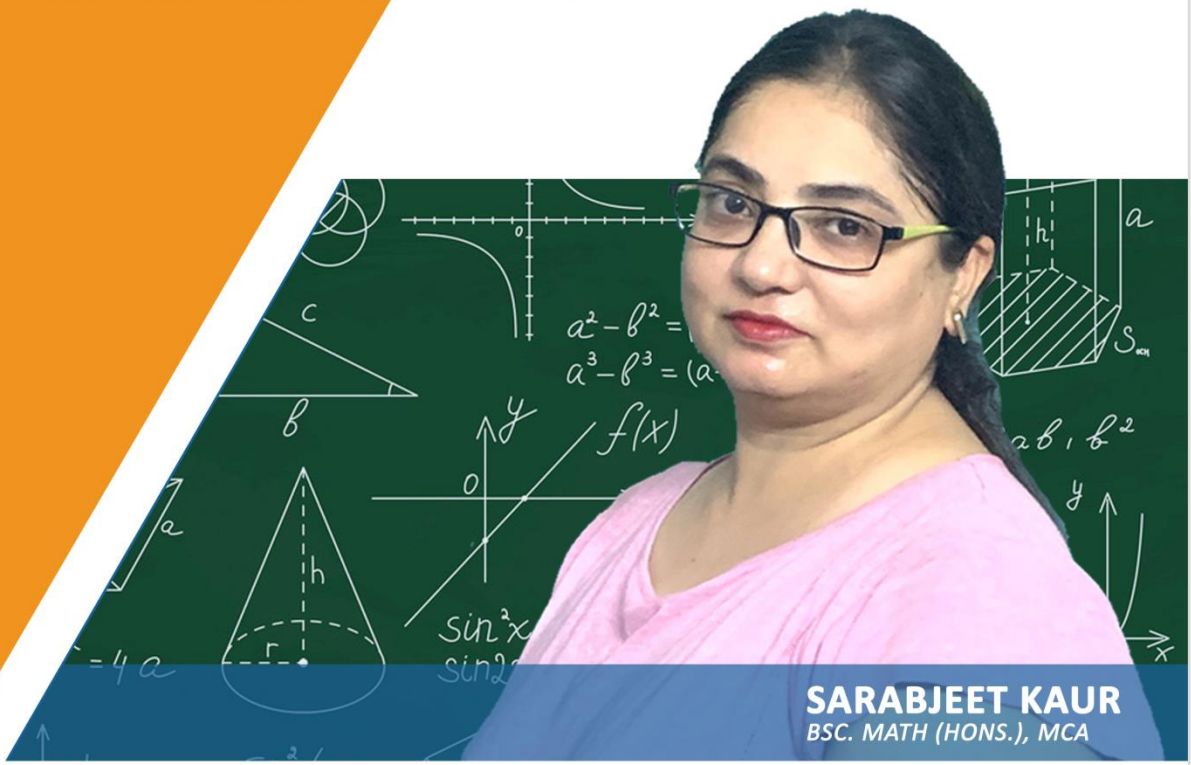

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GRADE 12TH MATHS

CHAPTER 4

DETERMINANTS

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OBJECTIVE TYPE QUESTIONS (1 MARK)

1. If $\begin{vmatrix} 2x & -1 \\ 4 & 2 \end{vmatrix} = \begin{vmatrix} 3 & 0 \\ 2 & 1 \end{vmatrix}$, then the – value of x is

(a) 3 (b) $\frac{2}{3}$ (c) $\frac{3}{2}$ (d) $-\frac{1}{4}$

2. If $\begin{vmatrix} 2x & 5 \\ 8 & x \end{vmatrix} = \begin{vmatrix} 6 & 5 \\ 8 & 3 \end{vmatrix}$, then the – value of x is

(a) 3 (b) ± 6 (c) ± 3 (d) 6

3. If $\begin{vmatrix} 2x & 5 \\ 8 & x \end{vmatrix} = \begin{vmatrix} 6 & -2 \\ 7 & 3 \end{vmatrix}$, then the – value of x is

(a) 3 (b) –3 (c) ± 3 (d) 0

4. The value $\begin{vmatrix} 6 & 0 & -1 \\ 2 & 1 & 4 \\ 1 & 1 & 3 \end{vmatrix}$ is

(a) –7 (b) 7 (c) 8 (d) 10

5. If $\Delta = \begin{vmatrix} 1 & x & x^2 \\ 1 & y & y^2 \\ 1 & z & z^2 \end{vmatrix}, \Delta_1 = \begin{vmatrix} 1 & 1 & 1 \\ yz & zx & xy \\ x & y & z \end{vmatrix}$, then the value of $\Delta + \Delta_1$ is

(a) 0 (b) –1 (c) 1 (d) none of these

6. The value of $\begin{vmatrix} \cos ec^2 x & \cot^2 x & 1 \\ \cot^2 x & \cos ec^2 x & -1 \\ 42 & 40 & 2 \end{vmatrix}$ is

(a) 0 (b) –1 (c) 1 (d) none of these

7. The value of $\begin{vmatrix} 1 & bc & a(b+c) \\ 1 & ca & b(c+a) \\ 1 & ab & c(a+b) \end{vmatrix}$ is

(a) 0 (b) –1 (c) 1 (d) none of these

8. If $\Delta = \begin{vmatrix} Ax & x^2 & 1 \\ By & y^2 & 1 \\ Cz & z^2 & 1 \end{vmatrix}, \Delta_1 = \begin{vmatrix} A & B & C \\ x & y & z \\ zy & zx & xy \end{vmatrix}$ then

(a) $\Delta_1 = -\Delta$ (b) $\Delta \neq \Delta_1$ (c) $\Delta - \Delta_1 = 0$ (d) none of these

9. If $\Delta = \begin{vmatrix} Ax^2 & x^3 & 1 \\ By^2 & y^3 & 1 \\ Cz^2 & z^3 & 1 \end{vmatrix}, \Delta_1 = \begin{vmatrix} Ax & By & Cz \\ x^2 & y^2 & z^2 \\ zy & zx & xy \end{vmatrix}$ then

(a) $\Delta_1 = -\Delta$ (b) $\Delta \neq \Delta_1$ (c) $\Delta - \Delta_1 = 0$ (d) $\Delta = x\Delta_1$

10. If x, y $\in$ R, then the determinant $\begin{vmatrix} \cos x & -\sin x & 1 \\ \sin x & \cos x & 1 \\ \cos(x+y) & -\sin(x+y) & 0 \end{vmatrix}$ lies in the interval

(a) $\sqrt{2}, \sqrt{2}$ (b) [–1, 1] (c) $\sqrt{2}, 1$ (d) $1, \sqrt{2}$

11. The determinant $\Delta = \begin{vmatrix} \sqrt{23}+\sqrt{3} & \sqrt{5} & \sqrt{5} \\ \sqrt{15}+\sqrt{46} & 5 & \sqrt{10} \\ 3+\sqrt{115} & \sqrt{15} & 5 \end{vmatrix}$ is equal to

(a) 0 (b) –1 (c) 1 (d) none of these

12. The determinant $\Delta = \begin{vmatrix} \sqrt{37}+\sqrt{3} & \sqrt{5} & \sqrt{5} \\ \sqrt{15}+\sqrt{74} & 5 & \sqrt{10} \\ 3+\sqrt{185} & \sqrt{15} & 5 \end{vmatrix}$ is equal to

(a) 0 (b) –1 (c) 1 (d) none of these

13. The determinant $\Delta = \begin{vmatrix} \sin^2 23^0 & \sin^2 67^0 & \cos 180^0 \\ -\sin^2 67^0 & -\sin^2 23^0 & \cos^2 180^0 \\ \cos 180^0 & \sin^2 23^0 & \sin^2 67^0 \end{vmatrix}$ is equal to

(a) 0 (b) –1 (c) 1 (d) none of these

14. If $A = \begin{vmatrix} 0 & 1 & 3 \\ 1 & 2 & x \\ 2 & 3 & 1 \end{vmatrix}$ and $A^{-1} = \begin{vmatrix} \frac{1}{2} & -4 & \frac{5}{2} \\ -\frac{1}{2} & 3 & -\frac{3}{2} \\ \frac{1}{2} & y & \frac{1}{2} \end{vmatrix}$, then the values of x and y are

(a) x = 0, y = 0 (b) x = 1, y = 1 (c) x = –1, y = 1 (d) x = 1, y = –1

15. The value of determinant $\begin{vmatrix} a-b & b+c & a \\ b-a & c+a & b \\ c-a & a+b & c \end{vmatrix}$ is

(a) $a^3 + b^3 + c^3$ (b) 3 bc (c) $a^3 + b^3 + c^3 - 3abc$ (d) none of these

16. The area of a triangle with vertices (–3, 0), (3, 0) and (0, k) is 9 sq. units. The value of k will be

(a) 9 (b) 3 (c) – 9 (d) 6

17. The determinant $\begin{vmatrix} b^2-ab & b-c & bc-ac \\ ab-a^2 & a-b & b^2-ab \\ bc-ac & c-a & ab-a^2 \end{vmatrix}$ equals

(a) abc (b–c) (c – a) (a – b) (b) (b–c) (c – a) (a – b)
(c) (a + b + c) (b – c) (c – a) (a – b) (d) None of these

18. The number of distinct real roots of $\begin{vmatrix} \sin x & \cos x & \cos x \\ \cos x & \sin x & \cos x \\ \cos x & \cos x & \sin x \end{vmatrix} = 0$ in the interval $-\frac{\pi}{4} \le x \le \frac{\pi}{4}$ is

(a) 0 (b) 2 (c) 1 (d) 3

19. If A, B and C are angles of a triangle, then the determinant $\begin{vmatrix} -1 & \cos C & \cos B \\ \cos C & -1 & \cos A \\ \cos B & \cos A & -1 \end{vmatrix}$ is equal to

(a) 0 (b) – 1 (c) 1 (d) None of these

20. If A, B and C are angles of a triangle, then the determinant $\begin{vmatrix} 1 & \cos C & \cos B \\ \cos C & 1 & \cos A \\ \cos B & \cos A & 1 \end{vmatrix}$ is equal to

(a) 0 (b) – 1 (c) 1 (d) None of these

21. Let f (t) = $\begin{vmatrix} \cos t & t & 1 \\ 2\sin t & t & 2t \\ \sin t & t & t \end{vmatrix}$, then $\lim_{t \to 0} \frac{f(t)}{t^2}$ is equal to

(a) 0 (b) – 1 (c) 2 (d) 3

22. Let f (x) = $\begin{vmatrix} \cos x & 2\sin x & \sin x \\ x & x & x \\ 1 & 2x & x \end{vmatrix}$, then $\lim_{x \to 0} \frac{f(x)}{x^2}$ is equal to

(a) 0 (b) – 1 (c) 2 (d) 3

23. The maximum value of $\Delta = \begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+\sin\theta & 1 \\ 1+\cos\theta & 1 & 1 \end{vmatrix}$ is (θ is real number)

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\sqrt{2}$ (d) $\frac{2\sqrt{3}}{4}$

24. If f (x) = $\begin{vmatrix} 0 & x-a & x-b \\ x+a & 0 & x-c \\ x+b & x+c & 0 \end{vmatrix}$, then

(a) f (a) = 0 (b) f (b) = 0 (c) f (0) = 0 (d) f (1) = 0

25. If A = $\begin{bmatrix} 2 & \lambda & -3 \\ 0 & 2 & 5 \\ 1 & 1 & 3 \end{bmatrix}$, then A^{-1} exists if

(a) $\lambda = 2$ (b) $\lambda \neq 2$ (c) $\lambda \neq -2$ (d) None of these

26. If A and B are invertible matrices, then which of the following is not correct?

(a) adj A = |A|. A^{-1} (b) $\det(a)^{-1} = [\det(a)]^{-1}$

(c) $(AB)^{-1} = B^{-1} A^{-1}$ (d) $(A + B)^{-1} = B^{-1} + A^{-1}$

27. If x, y, z are all different from zero and $\begin{vmatrix} 1+x & 1 & 1 \\ 1 & 1+y & 1 \\ 1 & 1 & 1+z \end{vmatrix} = 0$, then value of $x^{-1} + y^{-1} + z^{-1}$ is

(a) xyz (b) $x^{-1}\, y^{-1}\, z^{-1}$ (c) $-x-y-z$ (d) -1

28. The value of the determinant $\begin{vmatrix} x & x+y & x+2y \\ x+2y & x & x+y \\ x+y & x+2y & x \end{vmatrix}$ is

(a) $9x^2\,(x+y)$ (b) $9y^2\,(x+y)$ (c) $3y^2\,(x+y)$ (d) $7x^2\,(x+y)$

29. There are two values of a which makes determinant, $\Delta = \begin{vmatrix} 1 & -2 & 5 \\ 2 & a & -1 \\ 0 & 4 & 2a \end{vmatrix} = 86$, then sum of these number is

(a) 4 (b) 5 (c) -4 (d) 9

30. If $\Delta = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$ and A_{ij} is cofactor of a_{ij}, then the value of Δ is given by

(a) $a_{11}A_{31} + a_{12}A_{32} + a_{13}A_{33}$ (b) $a_{11}A_{11} + a_{12}A_{21} + a_{13}A_{31}$
(c) $a_{21}A_{11} + a_{22}A_{12} + a_{23}A_{13}$ (d) $a_{11}A_{11} + a_{21}A_{21} + a_{31}A_{31}$

31. If A is a matrix of order 3×3, then $|KA| =$ _____.

(a) 0 (b) -1 (c) 2 (d) 3

32. A and B are invertible matrices of the same order such that $|(AB)^{-1}| = 8$. If $|A| = 2$, then $|B|$ is

(a) 16 (b) 4 (c) 6 (d) $\frac{1}{16}$

33. If a, b, c are all distinct, and $\begin{vmatrix} a & a^2 & 1+a^3 \\ b & b^2 & 1+b^3 \\ c & c^2 & 1+c^3 \end{vmatrix} = 0$, then the value of abc is

(a) 0 (b) -1 (c) 3 (d) -3

34. Let A be a square matrix of order 2×2, then $|KA|$ is equal to

(a) $K|A|$ (b) $K^2|A|$ (c) $K^3|A|$ (d) $2K|A|$

35. Let A be a non-angular square matrix of order 3×3, then $|A \cdot \text{adj } A|$ is equal to

(a) $|A|^3$ (b) $|A|^2$ (c) $|A|$ (d) $3|A|$

36. Let A be a square matrix of order 3×3 and k a scalar, then $|kA|$ is equal to

(a) $k|A|$ (b) $|k|\,|A|$ (c) $k^3|A|$ (d) none of these

37. A is invertible matrix of order 3×3 and $|A| = 9$, then value of $|A^{-1}|$ is _____.

38. If area of a triangle with vertices (3, 2), (–1, 4) and (6, k) is 7 sq units, then possible values of k are___.

39. If A and B are invertible matrices of the same order $(AB)^{-1}$ is _____.

40. If A is a matrix of order 3×3, then $|3A| =$ _____ .

41. If A is invertible matrix of order 3×3, then $|A^{-1}|$ _____ .

42. If x, y, z $\in$ R, then the value of determinant $\begin{vmatrix} (2^x+2^{-x})^2 & (2^x-2^{-x})^2 & 1 \\ (3^x+3^{-x})^2 & (3^x-3^{-x})^2 & 1 \\ (4^x+4^{-x})^2 & (4^x-4^{-x})^2 & 1 \end{vmatrix}$ is equal to _____.

43. If $\cos 2\theta = 0$, then $\begin{vmatrix} 0 & \cos\theta & \sin\theta \\ \cos\theta & \sin\theta & 0 \\ \sin\theta & 0 & \cos\theta \end{vmatrix}^2 =$ _____.

44. If A is a matrix of order 3×3, then $(A^2)^{-1} =$ _____.

45. If A is a matrix of order 3×3, then number of minors in determinant of A are _____.

46. The sum of the products of elements of any row with the co-factors of corresponding elements is equal to _____.

47. If $x = -9$ is a root of $\begin{vmatrix} x & 3 & 7 \\ 2 & x & 2 \\ 7 & 6 & x \end{vmatrix} = 0$, then other two roots are _____.

48. If A, B, C are the angles of a triangle, then $\Delta = \begin{vmatrix} \sin^2 A & \cot A & 1 \\ \sin^2 B & \cot B & 1 \\ \sin^2 C & \cot C & 1 \end{vmatrix} =$ _____.

49. The value of $\begin{vmatrix} 0 & xyz & x-z \\ y-x & 0 & y-z \\ z-x & z-y & 0 \end{vmatrix}$ is _____.

50. Maximum value of $\Delta = \begin{vmatrix} 1 & 1 & 1+\cos\theta \\ 1 & 1+\sin\theta & 1 \\ 1 & 1 & 1 \end{vmatrix}$, where θ is a real number is _____.