SmartKalike

CBSE Class 12 · Maths

Determinants

10 most probable questions for Boards 2027

Q1. 0.5 marks · Very short answer

Evaluate |[[1, 0, 0], [2, 3, 0], [4, 5, 6]]| by expanding along the first row.

Answer

$$\begin{vmatrix} 1 & 0 & 0 \\ 2 & 3 & 0 \\ 4 & 5 & 6 \end{vmatrix} = 1(3 \times 6 - 0 \times 5) - 0(2 \times 6 - 0 \times 4) + 0(2 \times 5 - 3 \times 4)$$

$= 18$

$\therefore 18$

Q2. 1 mark · Very short answer

If A = 2B for 3 × 3 matrices and |B| = 5, calculate |A|.

Answer

$|A| = 2^3|B|$

$= 8 \times 5$

$\therefore |A| = 40$

Q3. 1.5 marks · Short answer

Find the determinants of A=[1 2; 2 4] and B=[1 2; 3 4], and classify each matrix as singular or nonsingular.

Answer

A square matrix is singular if its determinant is zero and nonsingular if its determinant is non-zero.

$$|A| = \begin{vmatrix} 1 & 2 \\ 2 & 4 \end{vmatrix}$$

$= 1 \times 4 - 2 \times 2$

$= 0$

$\therefore |A| = 0$; A is singular.

$$|B| = \begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix}$$

$= 1 \times 4 - 2 \times 3$

$= -2$

$\therefore |B| = -2$; B is nonsingular.

Q4. 2 marks · Short answer

Find the area of the triangle with vertices (1, 0), (6, 0) and (4, 3), using the determinant of their coordinates.

Answer

Area = 1/2 × |determinant of the coordinates|

Area = 1/2 ×
| 1 0 1
6 0 1
4 3 1 |

= 1/2 × |15|

∴ Area = 15/2 square units

Q5. 2.5 marks · Medium answer

Find the adjoint of A=[2 −3; 4 1], showing how the transpose of its cofactor matrix gives the result.

Answer

The adjoint of a square matrix is the transpose of its matrix of cofactors.

A = [
2 −3
4 1
]

$[A_{ij}]$ = [
$(-1)^{1+1}(1)$ $(-1)^{1+2}(4)$
$(-1)^{2+1}(-3)$ $(-1)^{2+2}(2)$
]

= [
1 −4
3 2
]

adj A = $[A_{ij}]^T$

= [
1 3
−4 2
]

∴ adj A = [
1 3
−4 2
]

Q6. 3 marks · Medium answer

For A=[1 2; 2 4] and B=[3; 7], find (adj A)B and determine whether AX=B has a solution.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/determinants

Q7. 4 marks · Long answer

Consider the two systems 0x+0y=0, 0x+0y=0 and 0x+0y=1, 0x+0y=0. For each, calculate (adj A)B and determine whether the system is consistent, showing what the zero product alone does not decide.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/determinants

Q8. 5 marks · Long answer

Evaluate |[[2, 1, 0], [3, 0, 0], [1, 4, 5]]| by expanding along the row or column containing the most zeros.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/determinants

Q9. 0.5 marks · Very short answer

For the entry in row 2, column 3 of a determinant, calculate its cofactor sign (−1)^(i+j).

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/determinants

Q10. 1 mark · Multiple choice

A triangle has area 4 square units. Which values can the determinant formed from its vertex coordinates take?

(A) 4 only

(B) −4 only

(C) 8 or −8

(D) 0

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