

## Determinants — CBSE Pattern Test 1

Class 12 Maths · 90 minutes · 40 marks · Sections A–D with answer key · Narayan Gurukul Academy

### Test 1 — CBSE Pattern (90 minutes, 40 marks)

Class 12 Maths · Determinants · Narayan Gurukul Academy (ClassApna)

General Instructions: (1) This paper has four sections — Section A ( $1 \times 10$ ), Section B ( $2 \times 4$ ), Section C ( $3 \times 4$ ) and Section D ( $5 \times 2$ ) — total 40 marks. Time allowed: 90 minutes.  
 (2) All questions are compulsory. No overall choice is given; internal choice, where allowed, is clearly marked.  
 (3) For MCQ questions choose the single correct option; for VSA answers write a single line.  
 (4) Take  $g = 10 \text{ m/s}^2$ . All symbols carry their usual meaning. Use of a calculator is not permitted.

#### Section A — MCQ & VSA ( $10 \times 1 = 10$ marks)

1. The value of  $|\begin{bmatrix} a & b \\ c & d \end{bmatrix}|$  is
  - (A)  $ad - bc$
  - (B)  $ab - cd$
  - (C)  $ac - bd$
  - (D)  $ad + bc$
2. If any two rows of a determinant are interchanged, its value
  - (A) changes sign
  - (B) remains the same
  - (C) becomes zero
  - (D) doubles
3. If two rows of a determinant are identical, its value is
  - (A) 0
  - (B) 1
  - (C)  $-1$
  - (D) undefined
4.  $A \cdot \text{adj}(A)$  equals
  - (A)  $|A| I$
  - (B)  $A$
  - (C)  $\text{adj}(A)$
  - (D) 0
5. The inverse of  $A$  exists if
  - (A)  $|A| \neq 0$
  - (B)  $|A| = 0$
  - (C)  $A = 0$
  - (D)  $A$  is singular
6.  $A^{-1}$  equals
  - (A)  $\text{adj}(A)/|A|$
  - (B)  $|A| \text{adj}(A)$
  - (C)  $\text{adj}(A)$
  - (D)  $1/|A|$
7. Cramer's rule solves a system using
  - (A) determinants

- (B) matrices only  
 (C) graphs  
 (D) vectors
8. If three points are collinear, the area of the triangle is  
 (A) 0  
 (B) 1  
 (C)  $\frac{1}{2}$   
 (D) undefined
9. Evaluate  $[[2, 3], [1, 4]]$ .
10. Define the minor of an element.

### Section B — Short Answer I ( $4 \times 2 = 8$ marks)

11. What is the order of a  $3 \times 3$  determinant?  
 12. What is the value of a determinant with two identical rows?  
 13. When is a matrix singular?  
 14. When is the area of a triangle zero?

### Section C — Short Answer II ( $4 \times 3 = 12$ marks)

15. Evaluate  $[[1, 2], [3, 4]]$ .  
 16. Prove that  $[[1, 2], [2, 4]] = 0$  using properties.  
 17. Find the adjoint of  $A = [[1, 2], [3, 4]]$ .  
 18. Solve  $x + y = 5$ ,  $x - y = 1$  using determinants.

### Section D — Long Answers ( $2 \times 5 = 10$ marks)

19. Evaluate the determinant  $[[1, 2, 3], [4, 5, 6], [7, 8, 9]]$ .  
 20. Find  $A^{-1}$  for  $A = [[2, 1], [1, 1]]$ . Find the area of the triangle with vertices (1, 0), (2, 2), (0, 3).

### Answer Key (Marking Scheme)

- Q1 — (A)  $ad - bc$ . Q2 — (A) changes sign. Q3 — (A) 0. Q4 — (A)  $|A|$ .  
 Q5 — (A)  $|A| \neq 0$ . Q6 — (A)  $\text{adj}(A)/|A|$ . Q7 — (A) determinants. Q8 — (A) 0.  
 Q9 — 5.  
 Q10 — The determinant left after deleting the row and column of the element.  
 Q11 —  $3 \times 3$ .  
 Q12 — 0.  
 Q13 — When  $|A| = 0$ .  
 Q14 — When the points are collinear.  
 Q15 — -2.  
 Q16 — Rows are proportional  $\vec{0}$ .  
 Q17 —  $[[4, -2], [-3, 1]]$ .  
 Q18 —  $x = 3$ ,  $y = 2$ .  
 Q19 — 0.

Q20 —  $A^{-1} = \begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix}$ ; area =  $5/2$ .