

Determinants

Here is the topic tree for the **Determinants** chapter from the NCERT 2025 mathematics textbook:

Chapter 4: Determinants

1. Introduction

- Connection between Matrices and Determinants
- Importance and Applications of Determinants

2. Determinant

- Definition of a Determinant
- Determinant of:
 - A Matrix of Order 1
 - A Matrix of Order 2
 - A Matrix of Order 3 (Expansion along a Row or Column)

3. Area of a Triangle Using Determinants

- Formula for the Area of a Triangle
- Condition for Collinearity of Points

4. Minors and Cofactors

- Definition of Minors
- Definition of Cofactors
- Expansion of Determinants Using Cofactors
- Properties of Determinants using Cofactors

5. Adjoint and Inverse of a Matrix

- Definition of Adjoint of a Matrix
- Properties of Adjoint Matrices
- Inverse of a Matrix using Determinants and Adjoint
- Condition for the Existence of an Inverse

6. Applications of Determinants and Matrices

- Solution of a System of Linear Equations Using:
 - Determinants (Cramer's Rule)
 - Inverse of a Matrix (Matrix Method)
- Consistency and Inconsistency of a System of Equations

7. Historical Note

- Development of Determinants in Mathematics
- Contributions of Mathematicians (Laplace, Gauss, Cauchy, etc.)

8. Exercises and Miscellaneous Problems

- Conceptual and Numerical Questions
- Proof-Based Questions
- Real-Life Applications of Determinants

This provides a structured overview of the chapter, covering definitions, formulas, applications, and historical perspectives. Let me know if you need a detailed explanation of any section!