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Academic Education CBSE › Class 12 Commerce › Mathematics

Relations and Functions

Mastering Relations and Functions in Mathematics

DEFINITION

Relations and functions are fundamental concepts in mathematics that describe how elements from one set relate to elements in another set. A relation is a set of ordered pairs, while a function is a specific type of relation where each input has exactly one output.

KEY CONCEPTS

Relations

A relation is a collection of ordered pairs, showing how two sets are connected.

Functions

A function is a relation where each input corresponds to exactly one output.

Domain and Range

The domain is the set of all possible inputs, while the range is the set of possible outputs.

Types of Functions

Functions can be classified as one-to-one, onto, or many-to-one based on their mapping.

Composite Functions

Composite functions combine two functions, where the output of one becomes the input of another.

EXAMPLES

- Relation:  $\{(1, 2), (2, 3), (3, 4)\}$
- Function:  $f(x) = 2x + 3$
- Composite Function:  $(f \circ g)(x) = f(g(x))$

MEMORY TIPS

- ★ Remember 'Function = One Input, One Output' to distinguish from relations.
- ★ Use 'D-R' to recall Domain and Range.
- ★ Think of 'C' in Composite as 'Combine' to remember function composition.

COMMON MISTAKES

- ✗ Confusing relations with functions by not checking the output uniqueness.
- ✗ Misidentifying the domain and range in a given function.
- ✗ Forgetting to apply the correct order in composite functions.

QUICK RECAP

Relations and functions are essential in mathematics, with functions being a special case of relations. Understanding the domain, range, and types of functions is crucial for solving problems effectively.