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Relations and Functions

Mastering Relations and Functions in Mathematics

DEFINITION

Relations connect sets of values, while functions are specific types of relations that assign each input exactly one output.

KEY CONCEPTS

Relation

A relation is a set of ordered pairs that shows how two sets are connected.

Function

A function is a relation where each input has a unique output.

Domain

The domain is the set of all possible input values for a function.

Range

The range is the set of all possible output values from a function.

Types of Functions

Common types include linear, quadratic, and polynomial functions, each with unique properties.

EXAMPLES

→ The relation {(1, 2), (2, 3), (3, 4)} connects numbers.

→ The function f(x) = x^2 assigns each x a unique square value.

→ The domain of f(x) = 1/x is all real numbers except x = 0.

MEMORY TIPS

★ Remember 'Function = Unique Output' to distinguish it from general relations.

★ Use 'D' for Domain and 'R' for Range to recall their definitions.

★ Think of functions as machines: each input produces one specific output.

COMMON MISTAKES

✗ Confusing relations with functions by not checking for unique outputs.

✗ Overlooking the domain restrictions, especially with fractions and square roots.

✗ Mixing up range and domain when analyzing functions.

QUICK RECAP

Relations show connections between sets, while functions are specific relations with unique outputs. Understanding domain and range is crucial for analyzing functions effectively.