### Why

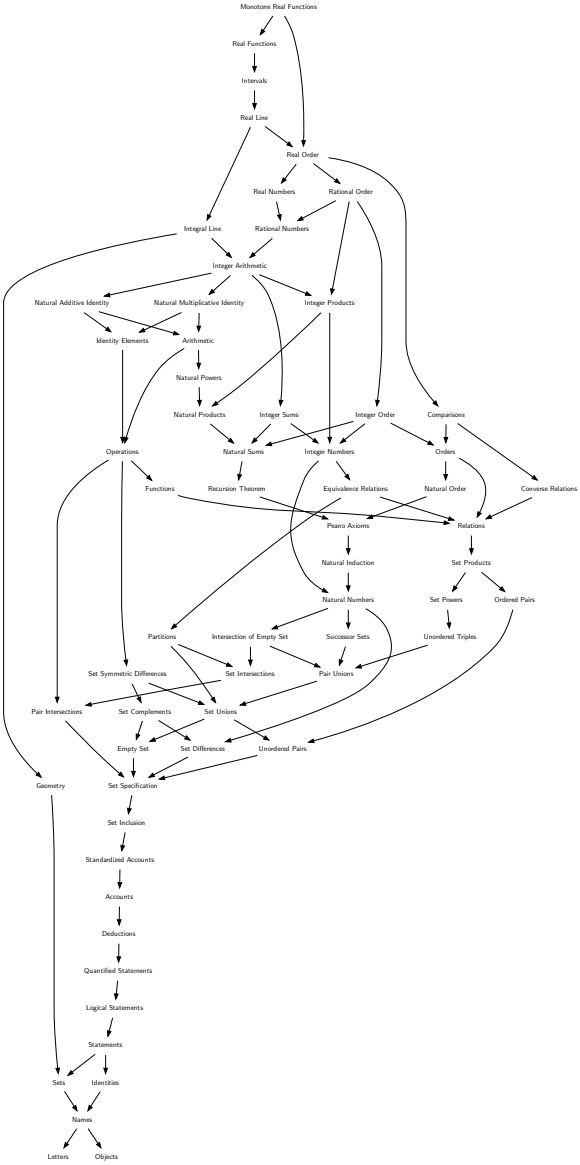
We can interpret a real function as tracing a path as we move from left to right in its domain.[1] We want language for whether this tracing increases or decreases the range values.

### Definition

Let $A \subset \mathbf{R}$ and let $f : A \to \mathbf{R}$. A function is *monotone increasing* if $f(x) < f(y)$ whenever $x < y$, and *monotone nondecreasing* if $f(x) \leq f(y)$ whenever $x, y \in \mathbf{R}$ and $x < y$.[2] Similarly we define *monotone decreasing* and *monotone nonincreasing*.

[1] Future editions will likely have this interpretation in a separate sheet.

[2] Unforunately, some authors use "monotone increasing" for "monotone nondecreasing" and use the terminolgy *strictly monotone increasing* for "monotone increasing".


Monotone Real Functions
Real Functions
Intervals
Real Line
Real Order
Real Numbers
Rational Order
Integral Line
Rational Numbers
Integer Arithmetic
Natural Additive Identity
Natural Multiplicative Identity
Integer Products
Identity Elements
Arithmetic
Natural Powers
Natural Products
Integer Sums
Integer Order
Comparisons
Operations
Natural Sums
Integer Numbers
Orders
Functions
Recursion Theorem
Equivalence Relations
Natural Order
Converse Relations
Peano Axioms
Relations
Natural Induction
Set Products
Natural Numbers
Set Powers
Ordered Pairs
Partitions
Intersection of Empty Set
Successor Sets
Unordered Triples
Set Symmetric Differences
Set Intersections
Pair Unions
Pair Intersections
Set Complements
Set Unions
Empty Set
Set Differences
Unordered Pairs
Geometry
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects