Why

We want to indicate membership in a set by a function.[1]

Definition

The *characteristic function* of a set X is a function from X to 2 which is 1 if the argument is in A and 0 otherwise.

The function which assigns to each subset A of X to characteristic function of A is a one-to-one function from $\mathcal{P}(X)$ onto 2^X.

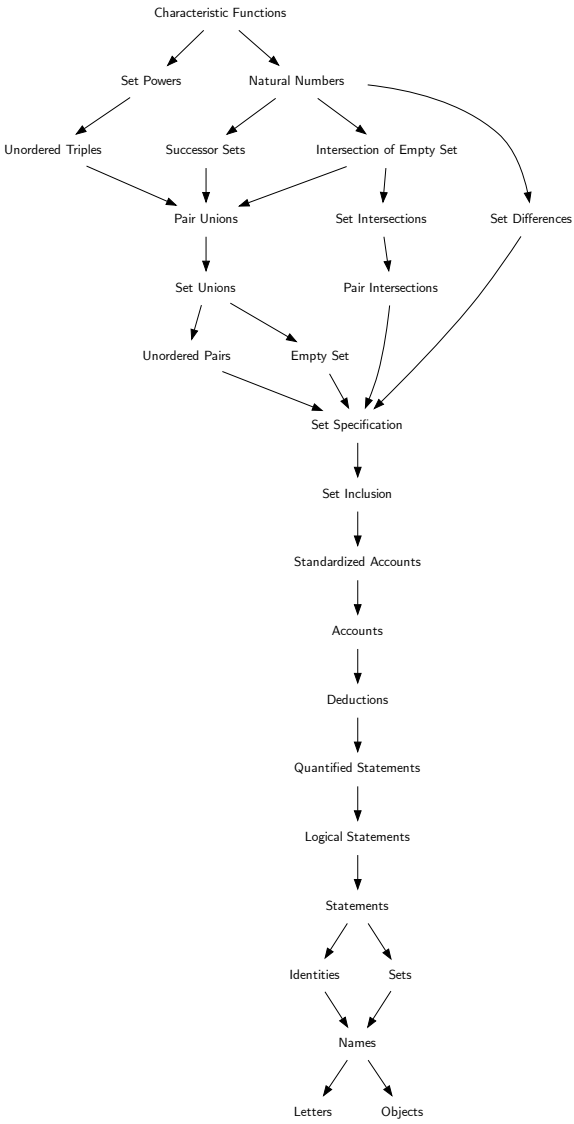
Notation

Let A be a non-empty set and $B \subset A$. We denote the characteristic function of B in A by $\chi_B : A \to R$. The Greek letter χ is a mnemonic for "characteristic".

The subscript indicates the set on which the function is one. In other words, for all $B \subset A$, $\chi_B^{-1}(\{1\}) = B$.[2]

[1] Future editions will elaborate, perhaps with forward-looking connections to Rectangular Functions.

[2] Another notation used, when referring to these as "indicator functions," is $1_B : A \to \{0, 1\}$ or $\mathbf{1}_B$.


Characteristic Functions
Set Powers
Natural Numbers
Unordered Triples
Successor Sets
Intersection of Empty Set
Pair Unions
Set Intersections
Set Differences
Set Unions
Pair Intersections
Unordered Pairs
Empty Set
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects