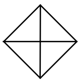


Why

We want to consider all the subsets of a given set.

Principle 1 (Powers)**.** *For every set, there exists a set of its subsets.*

We call the existence of this set the *principles of powers* and we call the set the *power set.*[1] As usual, the principle of extension gives uniqueness (see *Set Equality*). The power set of a set includes the set itself and the empty set.

Notation

Let A denote a set. We denote the power set of A by A^*, read aloud as "powerset of A." $A \in A^*$ and $\varnothing \in A^*$. However, $A \subset A^*$ is false.

Examples

Let a, b, c denote distinct objects. Let $A = \{a, b, c\}$ and $B = \{a, b\}$. Then $B \subset A$. In other notation, $B \in A^*$. We can walk through examples of power sets.

ßEmpty Set

Proposition 1. $\varnothing^* = \{\varnothing\}$

[1]This terminology is standard, but unfortunate. Future editions may change these terms.

§Singletons

Proposition 2. $\{a\}^* = \{\varnothing, \{a\}\}$

§Pairs

Proposition 3. $\{a, b\}^* = \{\varnothing, \{a\}, \{b\}, \{a, b\}\}$

§Triples

Proposition 4. $\{a, b, c\}^* \{\varnothing, \{a\}, \{b\}, \{c\}, \{a, b\}, \{b, c\}, \{a, c\}, \{a, b, c\}\}$

Properties

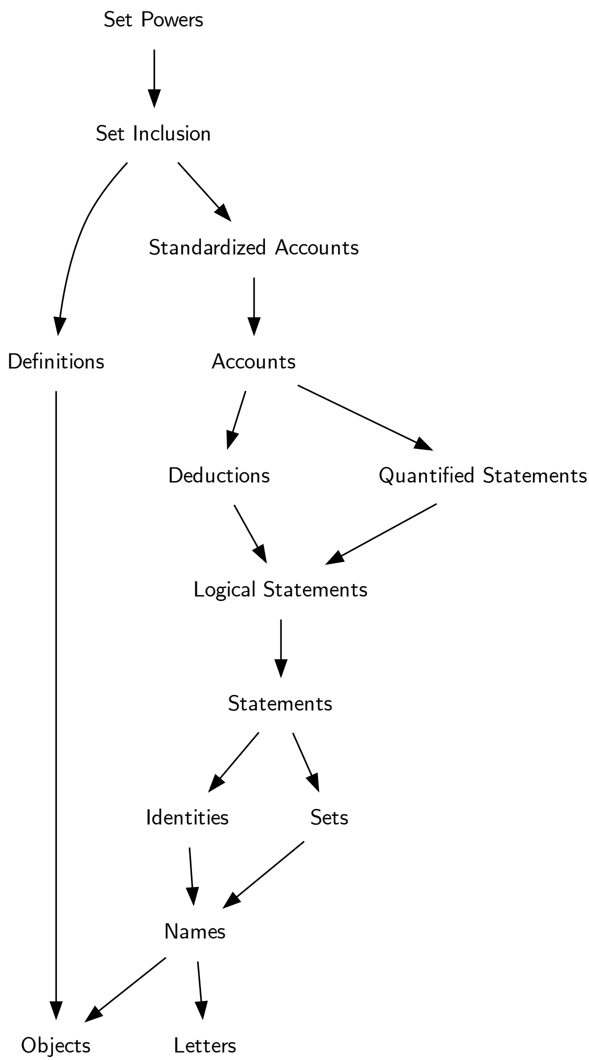
We can guess the following easy properties.[2]

Proposition 5. $\varnothing \in A^*$

Proposition 6. $A \in A^*$

We call A and $\varnothing$ the *improper* subsets of A. All other subset we call *proper*.

[2]Future editions will expand this account.


Set Powers
Set Inclusion
Standardized Accounts
Definitions
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Objects
Letters