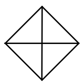


Why

Does a set exist containing the elements shared between two sets? How might we construct such a set?

Definition

Let A and B denote sets. Consider the set $\{x \in A \mid x \in B\}$. This set exists by the principle of specification (see *Set Specification*). Moreover $(y \in \{x \in A \mid x \in B\}) \longleftrightarrow (y \in A \land y \in B)$. In other words, $\{x \in A \mid x \in B\}$ contains all the elements of A that are also elements of B.

We can also consider $\{x \in B \mid x \in A\}$, in which we have swapped the positions of A and B. Similarly, the set exists by the principle of specification (see *Set Specification*) and again $y \in \{x \in B \mid x \in A\} \longleftrightarrow (y \in B \land y \in B)$. Of course, $y \in A \land y \in B$ means the same as[1] $y \in B \land y \in A$ and so by the principle of extension (see *Set Equality*)

$$\{x \in A \mid x \in B\} = \{x \in B \mid x \in A\}.$$

We call this set the *pair intersection* of the set denoted by A with the set denoted by B.

ßNotation

We denote the intersection fo the set denoted by A with the set denoted by B by $A \cap B$. We read this notation aloud as "A intersect B".

[1] Future editions will name and cite this rule.

ßBasic Properties

All the following results are immediate.[2]

Proposition 1. $A \cap \varnothing = \varnothing$

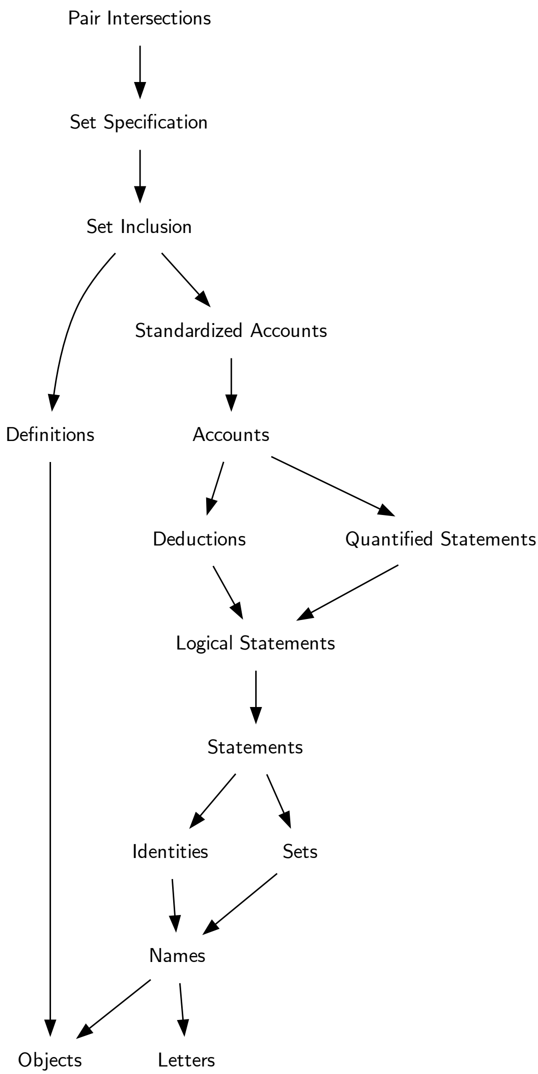
Proposition 2 (Commutativity)**.** $A \cap B = B \cap A$

Proposition 3 (Associativity)**.** $(A \cap B) \cap C = A \cap (B \cap C)$

Proposition 4. $A \cap A = A$

Proposition 5. $(A \subset B) \longleftrightarrow (A \cap B = A)$.

[2]Proofs of these results will appear in the next edition.


Pair Intersections
Set Specification
Set Inclusion
Standardized Accounts
Definitions
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Objects
Letters