Definition 1 (Set)**.** A set is a well defined collection of objects defined in such a manner that it can be determined for any given object x whether or not x belongs to the set.

Definition 2 (Subset)**.**

$$A \subseteq B \iff a \in A \implies a \in B \ .$$

Definition 3 (Equality of sets)**.**

$$A = B \iff A \subseteq B \wedge B \subseteq A \ .$$

Definition 4 (Proper subset)**.**

$$A \subset B \iff A \subseteq B \wedge A \neq B \ .$$

Definition 5 (Empty set)**.**

$$\forall x : x \notin \emptyset \ .$$

Definition 6 (Union of sets)**.**

$$A \cup B = \{x : x \in A \vee x \in B\} \ .$$

Definition 7 (Intersection of sets)**.**

$$A \cap B = \{x : x \in A \wedge x \in B\} \ .$$

Definition 8 (Disjoint sets)**.** Sets A and B are disjoint if $A \cap B = \emptyset$.

Definition 9 (Set complement)**.** Let U be the universal set, and let $A \subseteq U$. The complement of A is the set

$$A' = \{x \in U : x \notin A\} \ .$$

Definition 10 (Set difference)**.**

$$A \setminus B = A \cap B' = \{x \in A : x \notin B\} \ .$$

Definition 11 (Cartesian product of sets)**.**

$$A \times B = \{(a, b) : a \in A \wedge b \in B\} \ .$$