

Definition 1 (Subset).

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

Definition 2 (Equality of sets).

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

Definition 3 (Proper subset).

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

Definition 4 (Empty set).

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

Definition 5 (Union of sets).

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

Definition 6 (Intersection of sets).

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

Definition 7 (Disjoint sets). Sets A and B are disjoint if $A \cap B = \emptyset$.

Definition 8 (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 9 (Set difference).

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

Definition 10 (Cartesian product of sets).

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