Subsets

1 Why

How do sets relate?

2 Two Sets

A **subset** of a first set is any second set for which each element of the second is an element of the first. A **superset** of a first set is any second set for which each element of the first set is an element of the second. Two sets are **equal** if the first is a subset of the second and the second is a subset of the first. In this case, the sets contain the same elements.

The **empty set** is the set containing no elements. The empty set is subset of every set. The **power set** of a set is the set of all subsets of that set. It includes the set itself and the empty set. We call these two sets **improper subsets** of the set. We call all other sets **proper subsets**.

We distinguish the set containing one element from the element itself. For example, consider a set which contains one element: this element is the empty set. Then the empty set is an element of this set. The empty set is contained in this set.

The empty set is not equal to this set.

2.1 Notation

Let A and B be sets. We denote that A is a subset of B by $A \subset B$. We read the notation $A \subset B$ aloud as "A subset B". We denote that A is equal to B by $A = B$. We read the notation $A = B$ aloud as "A equals B". We denote the empty set by $\varnothing$, read aloud as "empty." We denote the power set of A by 2^A, read aloud as "two to the A." $A \in \{A\}$ is true whereas $A = \{A\}$ is false.