Subsets

Every element in a set A is also an element of a set B, then A is called a **subset** of B. We also say that B contains A. This relationship is written:

$A \subset B$ or **$B \supset A$**

If A is **not a subset** of B, i.e. if at least one element of A dose not belong to B, we write **$A \not\subset B$**.

Example (4):

Consider the sets.

$A = \{1,3,4,5,8,9\}$ $B = \{1,2,3,5,7\}$ and $C = \{1,5\}$

Then $C \subset A$ and $C \subset B$ since 1 and 5, the element of C, are also members of A and B.

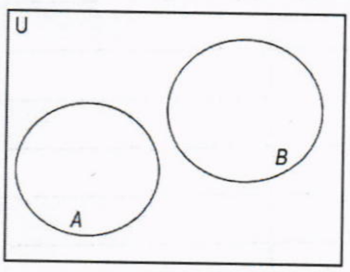
But $B \not\subset A$ since some of its elements, e.g. 2 and 7, do not belong to A. Furthermore, since the elements of A,B and C must also belong to the universal set U, we have that U must at least the set $\{1,2,3,4,5,7,8,9\}$.

$A \subset B : \{\forall\ x \in A \Rightarrow x \in B$

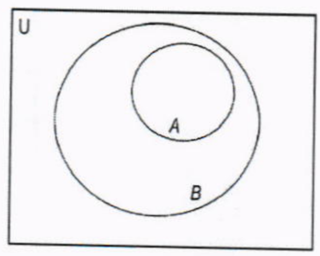
$A \not\subset B : \{\exists\ x \in A$ but $x \notin B$

$\forall$: For all $\exists$: There exists

The notion of subsets is graphically illustrated below:



A and *B* are disjoint or $(A \cap B = \varnothing)$ so we could write $A \not\subset B$ and $B \not\subset A$.



A is entirely within B so $A \subset B$.