

3) The empty set ϕ is a subset of every set A .

Since ϕ has no element which doesn't belong to A . (i.e. $\phi \subseteq A$; $\phi \notin A$.)

* Defⁿ(2): Two sets S and T are said to be equal, written as $S=T$ iff $S \subseteq T$ and $T \subseteq S$.

Thus $S=T \Leftrightarrow S \subseteq T$ and $T \subseteq S$.

Equivalently,

two sets are said to be equal if they contain the same elements.
for example

$$\{2, 3, 5, 7\} = \{7, 2, 5, 3\} \text{ and } \{2, 3, 5, 7\} \neq \{2, 5, 7, 6\}.$$

* Defⁿ(3): The union of two sets S and T denoted by $S \cup T$ is defined as

$$S \cup T = \{x : x \in S \text{ or } x \in T\}$$

* Defⁿ(4): The intersection of two sets S and T , denoted as $S \cap T$, is defined as

$$S \cap T = \{x : x \in S \text{ and } x \in T\}$$

In other words, $S \cap T$ contains the common elements of S and T .

* Defⁿ(5): Two sets S and T are said to be disjoint if $S \cap T = \phi$.