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* Defⁿ (8):

The intersection of the sets $\{S_\lambda\}$ is defined as

$$\bigcap_{\lambda \in \Delta} S_\lambda = \{x : x \in S_\lambda \text{ for each } \lambda \in \Delta\}$$

* Defⁿ (9):

If S and T are two sets, then the difference of S and T denoted as $S-T$, is defined as,

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

for example: If $S = \{1,2,3,4,8\}$ and $T = \{2,3,5,6,7\}$,

then $S-T = \{1,4,8\}$

* Defⁿ (10).

If S is a subset of a set X, then the Complement of S, denoted by $X \setminus S$, is defined as,

$$X \setminus S = \{x : x \in X \text{ and } x \notin S\}$$

Other notations of the Complement of S are S' or S^c.

Thus, $x \in X - S \Rightarrow x \in X$ but $x \notin S$.

for example;

If $X = \{1,2,3,4, \ldots, 10\}$, and $S = \{2,4,6,8,10\}$

then,

$$X \setminus S = \{1,3,5,7,9\}.$$

Remarks:- The truth of each of the following statements is easy to verify.

1. $S \cup S = S$, $S \cap S = S$
2. $S \cup T = T \cup S$, $S \cap T = T \cap S$.
3. $S \cup \phi = S$, $S \cap \phi = \phi$.