

(c) $\forall$ means "for all"

for example, all natural numbers are positive may be written as
 $x > 0 \quad \forall x \in \mathbb{N}$

(d) $\exists$ means 'there exists'

for example, in the set $S = \{1, 2, 3, \dots, 10\}$
 $\exists 10 \in S$ such that $10 > 9$.

(e) $\wedge$ stands for 'and', $\vee$ stands for 'or'

for example, $x > 0 \wedge y > 0 \Rightarrow xy > 0$
 $x^2 \geq 1 \Rightarrow x = 1 \vee x = -1$.

(f) ϵ read as (Epsilon) and δ (delta) denote small positive numbers,
 for example

$$\epsilon = \frac{1}{100}; \quad \delta = \frac{1}{1000}$$

1.3 Some Set Theoretic Concepts.

Defⁿ (1):- if S and T be two sets such that every element of S is also an element of T , then we say that S is a subset of T or S is contained in T ; we write it as $S \subset T$.

Symbolically, $S \subset T$, if $x \in S \Rightarrow x \in T \quad \forall x$
 if S is contained in T , then we also say that T contains S or T is a super set of S and we write it as $T \supset S$.

thus,

$$S \subset T \Leftrightarrow T \supset S$$

illustrations

1. let $S = \{1, 3, 5\}$ and $T = \{1, 2, 3, 4, 5\}$
 then $S \subset T$

2. let $S = \{1, 3, 6\}$ and $T = \{1, 2, 3, 4, 5\}$
 then $S \not\subset T \because 6 \in S \Rightarrow 6 \notin T$