

some **TEX** symbols

<i>pronounce</i>	<i>write</i>	T<small>E</small>X
backslash	\	\backslash
<i>logic :</i>		
for all	\forall	\forall
there is	\exists	\exists
not	\sim	\sim
equivalent to	\equiv	\equiv
implies	$P \rightarrow Q$	$P \rightarrow Q$
implies	$P \rightarrow Q$	$P \rightarrow Q$
iff (if and only if)	$P \leftrightarrow Q$	$P \leftrightarrow Q$
<i>set theory:</i>		\mbox{\settheory{}}
in (element of)	$x \in A$	$x \in A$
union	$A \cup B$	$A \cup B$
intersection	$A \cap B$	$A \cap B$
minus	$A \setminus B$	$A \setminus B$
circle	$A \circ B$	$A \circ B$
subset	$A \subset B$	$A \subset B$
subset	$A \subseteq B$	$A \subseteq B$
superset	$A \supset B$	$A \supset B$
superset	$A \supseteq B$	$A \supseteq B$
<i>negations :</i>		
	\nexists	\not\exists
	$P \not\rightarrow Q$	$P \not\rightarrow Q$
	$x \notin A$	$x \not\in A$
	$A \not\subset B$	$A \not\subset B$

Comments

Restrictions : $(\exists x \in A)P(x)$ means: $(\exists x)[(x \in A) \wedge P(x)]$
 while $(\forall x \in A)P(x)$ means: $(\forall x)[(x \in A) \rightarrow P(x)]$

$$\begin{array}{lll} \text{Hence } & \sim(\forall x \in A)P(x) \equiv (\exists x \in A)\sim P(x) & \equiv (\exists x)(x \in A) \wedge \sim P(x) \\ \text{while } & \sim(\exists x \in A)P(x) \equiv (\forall x \in A)\sim P(x) & \equiv (\forall x)[(x \in A) \rightarrow \sim P(x)] \end{array}$$

Remark. The predicate $(\forall x)[Q(x) \rightarrow R(x)]$ is usually (and somewhat sloppily?) written as “if $Q(x)$ then $R(x)$ ”. When we use the words “if …, then …” (rather than the symbol $\dots \rightarrow \dots$), the universal quantifier is tacitly understood.

Thus, $(\forall x \in A)P(x)$ means: **if** $x \in A$ **then** $P(x)$.

set union:	$(\forall x) [(x \in A \cup B) \leftrightarrow (x \in A \text{ or } x \in B)]$
set intersection:	$(\forall x) [(x \in A \cap B) \leftrightarrow (x \in A \text{ and } x \in B)]$
set difference:	$(\forall x) [(x \in A \setminus B) \leftrightarrow (x \in A \text{ and } x \notin B)]$
symmetric difference:	$(\forall x) [(x \in A \circ B) \leftrightarrow (\{x \in A \text{ and } x \notin B\} \text{ or } \{x \in B \text{ and } x \notin A\})]$

Containment:

subset $A \subset B$ [or $A \subseteq B$]: $(\forall x \in A)x \in B$, that is, if $x \in A$ then $x \in B$
 — read: “ A is a subset of B ”.

superset $A \supset B$ [or $A \supseteq B$] — “ A is a superset of B ”, or “ A contains B ”

Note that $A \cup B$ is a set, while $A \subset B$ is a statement.