Sections 1.3 Finite and Infinite Sets

A set S is finite if it is either empty (ie, has 0 elements) or if there exists a bijection from the set $\mathbb{N}_n = \{1, 2, 3, \cdots, n\}$ onto S for some $n \in \mathbb{N}$ (ie, has n elements).

A set S is infinite if it is not finite.

Theorem

a) If C is an infinite set and B is a finite set, then $C \backslash B$ is an infinite set.

b) If S is a finite set and $T \subseteq S$, then T is a finite set.

c) If T is an infinite set and $T \subseteq S$, then S is an infinite set.

A set S is denumerable (countably infinite) if there exists a bijection of $\mathbb{N}$ onto S.

S is countable if it is either finite or denumerable.

S is uncountable if it is not countable.

Theorem Let S, T be sets such that $T \subseteq S$.

a) If S is countable, then T is countable.

b) If T is uncountable, then S is uncountable.