

Math 4200
Sets

Definitions:

Two sets A and B are the same size (equinumerous) if there exists a function $f : A \rightarrow B$ such that f is 1-1 and onto. A is said to be equivalent to B and we write $A \approx B$ or $|A| = |B|$.

For each n , let $J_n = \{1, 2, 3, \dots, n\}$. A set A is finite if $A = \emptyset$ or $A \approx J_n$ for some n .

A set A is infinite if A is not finite.

A set A is countable if A is finite or $A \approx J$.

A set A is uncountable if A is not countable.

Theorems:

If $A \subseteq B$ and B is finite, then A is finite.

If A and B are finite then $A \times B$ is finite.

If $A \subseteq B$ and B is countable, then A is countable.

If A and B are countable then $A \times B$ is countable.

\mathbb{Q} , the set of rational numbers, is countable.

\mathbb{R} , the set of real numbers, is uncountable.

Given any A , the power set of A , denoted by $P(A)$, is not equivalent to A .