

Assignment 3a.

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* The union of two uncountable sets is uncountable.

True.

We have two uncountable sets A and B .

Assume $A \cup B$ is countable.

\therefore It exists N_0 as the cardinality of $A \cup B$.

$$N_0 = |A \cup B|$$

while $A \subseteq A \cup B$, $B \subseteq A \cup B$

$$\therefore |A| \leq |A \cup B| \quad |B| \leq |A \cup B|$$

$$|A| \leq N_0, \quad |B| \leq N_0.$$

So A and B have cardinality smaller ~~the~~ ^{than} or equal to N_0 .

A and B are countable.

It has contradiction.

So $A \cup B$ is uncountable.

* The intersection of two uncountable sets is uncountable.

False.

1. if the intersection of two uncountable sets is null. \varnothing . Then it's countable.
2. The intersection of $[0, 1]$ and $[1, 2]$ is $\{1\}$, countable.
3. for each uncountable set could have a countable subset. if the intersection exists and the intersection is the same countable subset of the two uncountable sets. Then the intersection is countable.