Discrete Mathematics, Tutorial V

1. Show that the sets $(0, 1)$ and $[0, 1]$ have the same cardinality.
2. Show that there is no infinite set A, where $|A| < \aleph_0$
3. Show that if A is infinite set, then it contains a countably infinite subset.
4. Show that the union of countable number of countable sets is countable.
5. Give an example of two uncountable sets A and B, such that $A \cap B$ is:
   (a) Finite
   (b) Countably infinite
   (c) Uncountable
6. Determine whether the following sets are countable or uncountable.
   (a) Integers divisible by 5 but not by 7.
   (b) Real numbers whose decimal representation consist of all 1's.