

# Topology 1

Answer the following questions:

March 21, 2005

1. Prove the Schroder-Bernstein theorem: for  $A$  and  $B$  sets, if  $f$  is a one to one mapping of  $A$  into  $B$ , and  $g$  is a one to one mapping of  $B$  into  $A$ , then  $A$  and  $B$  are equinumerous.
2. Prove that a compact metric space is separable.
3. Prove that the continuous image of a compact space is compact.
4. Prove the Heine-Borel Theorem: The unit interval is compact.
5. Describe the Cantor set. What is it's cardinality? Is  $.25$  in the Cantor Set?