Quiz4 - Math 313 **- Fall** 2014

1. (a) Let $\{a_n\}$ be a sequence of real numbers with $n = 1, 2, 3, \cdots$. Give the definition that $\{a_n\}$ is a Cauchy Sequence.

   (b) Explain as clearly as you can why, given any infinite decimal of the form
   $$.d_1 d_2 d_3 \cdots,$$
   the sequence $\{a_n\}$ with
   $$a_n = .d_1 d_2 d_3 \cdots d_n$$
   is a Cauchy sequence.

   (c) True or False: There are no infinite sets whose cardinality is greater than the cardinality of the real numbers.

   (d) Prove that the number $.101001000100001000001 \cdots$ is irrational.