Math 131AH, Honors Analysis, UCLA
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Exam 1, October 17, 2016

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No electronics are permitted. You can use results from the course in your proofs, but please say what results you are using.

(1) Find a bijection between $[0,1]$ and the half-open interval $[0,1)$.

(2) Let a and b be elements of an ordered field F. Show that if $a \geq c$ for every $c < b$, then $a \geq b$.

(3) Show that for every positive real number a, there is a positive integer N such that for all integers $n \geq N$, we have $1/\sqrt{n} < a$.

(4) Give an example of an infinite closed subset E of $\mathbf{R}$ that is contained in $[0,1]$ and has empty interior. Please show that your set E is closed in $\mathbf{R}$; you don't need to prove the other properties, although they should be true.