

**18.099b Problem Set 2a**

*Due:* Thursday, February 26th (in class or before).

1. Suppose  $F \subseteq \mathbb{R}$  is a subset of the real numbers for which  $\sup F$  exists. Show that  $\sup F = \lim_{n \rightarrow \infty} a_n$  for some sequence  $\{a_n\}$  of numbers in  $F$ .

(Note:  $\sup F$  is the *least upper bound* of  $F$ : the least number  $\alpha$  such that  $x \leq \alpha$  for all  $x \in F$ .)

2. Let  $\{a_n\}$  be a sequence of real numbers. Prove that if  $\{a_n\}$  converges then so does  $\{|a_n|\}$ .