

## ACM 105: Problem set 4

Due: May 2, 2008

**Announcement: The midterm period is May 5-7.**

1. Show that a one point set has outer measure zero. Hence, show that any countable set has outer measure zero.
2. Let  $E_1 \subset E_2$  be two subsets of  $R^n$ . Show that  $|E_1|_e \leq |E_2|_e$ .
3. Show that the boundary of an interval (that is, closed rectangle) has outer measure zero.
4. Let  $\{E_k\}$  be a sequence of sets with  $\sum |E_k|_e < +\infty$ . Show that  $\limsup E_k$  and  $\liminf E_k$  have outer measure zero.