Problem set 6- due November 18. Write clear and complete solutions for each problem. You may send them to the grader Gavin Glenn (email: glenng at purdue dot edu) and cc me (preferred method), or hand it to me in class. Please make your writing clearly legible.

1) Let X be a compact Hausdorff space. Prove that given any point $x \in X$ and an open set U containing x, there is always another open set $V \subset U$ such that $x \in V$ and $\overline{V} \subset U$, where $\overline{V}$ denotes the closed of V in X.

2) Prove that if $A$and B are compact subspaces of a space X then so is $A \cup B$. If in addition X is Hausdorff, show that $A \cap B$ is compact.

3) Let X be the real numbers with the topology in which the open sets are the complements of finite sets (and the empty set). Show that X is compact.

26.5, 26.6, 27.2(b)(c)(d), 29.6, 29.8