1. Show that if $K$ is a compact subset of the Hausdorff space $X$ and $x \notin K$ then there are open, disjoint sets $U$ and $V$ such that $K \subseteq U$ and $x \in V$.

For extra credit show that if $K$ and $L$ are disjoint, compact subsets of the Hausdorff space $X$ then there are open disjoint sets $U$ and $V$ such that $K \subseteq U$ and $L \subseteq V$.

2. Show that if $X$ is a compact topological space, $Y$ is a Hausdorff topological space and $f : X \to Y$ is continuous then $f(G)$ is closed for all closed subset $G$ of $X$. 