Do problems 1.4 and 1.5 from Intuitive Topology, and the following problems:

1. Let (X, d) be a metric space. Let $x \in X$. Show that if $0 < r < s$ then $B_r(x) \subset B_s(x)$.
2. Prove that if A and B are open sets in a metric space, then $A \cap B$ is open.
3. Show by example that the intersection of an infinite collection of open sets is not necessarily open.