20.03.2006-24.03.2006
HW 152

1. Show that X and Y are connected topological spaces if and only if X x Y is connected.

2. If X is a topological space and $Y \subseteq X$, then we can define a topology on Y as follows:
Open subsets of Y are the intersection of open subsets of X with Y.
Check that this really defines a topology on Y.

3. Show that open subsets of $\mathbb{Q}$ are unions of open intervals (a, b) for $a, b \in \mathbb{Q}$.

4. Let X be a topological space. Let $Y \subseteq X$. Show that if Y is connected then so is $\overline{Y}$.

5. Let X be a topological space. $(A_i)_{i \in I}$ is connected space of X. Suppose that for all i, j $A_i \cap A_j \neq \emptyset$. Show that $\cup A_i$ is connected.