Group: ______________ ______________ ______________ Name: _______________

Math 351 - Elementary Topology
Wednesday, September 26 $**$ *The subspace topology*

The problems below concern the subspace topology. Recall that if X is a topological space and $A \subseteq X$ is a subset, we define the **subspace topology** on A by specifying that a subset

$$V \subset A \quad \text{is open} \Leftrightarrow \quad V = U \cap A \quad \text{for some open set} \quad U \subset X.$$

Make sure to justify all of your answers.

1. (1 **point**) Show that if X is Hausdorff and $A \subseteq X$, then A is also Hausdorff if it is given the subspace topology.

2. (**2 points**) Let

$$A \subseteq X \qquad \text{and} \qquad B \subseteq A.$$

Then A can be considered as a subspace of X and B can be considered as a subspace of A. But B can *also* be considered as a subspace of X. **Show that** the two resulting subspace topologies on B (one coming from A and the other from X) are in fact the same topology.

Write your answer(s) on the rest of this sheet (and back).
