Group: _____ _____ _____ Name: _____

Math 351 - Elementary Topology
Wednesday, October 24 $**$ *Products and the Hausdorff condition*

1. Show that if X and Y are Hausdorff spaces, then so is their product $X \times Y$.

2. Show that X is Hausdorff if and only if the diagonal subset

$$\Delta(X) = \{(x, y) \in X^2 \mid x = y\} \subseteq X \times X$$

   is closed.

3. Let $f, g : X \longrightarrow Y$ be continuous, and suppose that Y is Hausdorff. Show that if $D \subset X$ is *dense* in X and $f(d) = g(d)$ for all $d \in D$, then necessarily $f(x) = g(x)$ for all $x \in X$.
   Hint: This was on a previous worksheet, but it now follows easily from problem 2 above.

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