**Name:** _____

**Homework 2 - Topology** **Due Monday, Feb. 4, 2008**

**1.** (Ex. 13 p. 101 textbook) Show that $X$ is Hausdorff if and only if the **diagonal** $\Delta = \{(x, x) \mid x \in X\}$ is closed in $X \times X$.

**2.** Let $X$ be a topological space and $A$ an arbitrary subset of $X$. Show that

$(i)$ $Cl(Int(Cl(Int(A)))) = Cl(Int(A))$, $(ii)$ $Int(Cl(Int(Cl(A)))) = Int(Cl(A))$,

where $Cl(A)$ denotes the closure of $A$ and $Int(A)$ denotes the interior of $A$.

With this exercise in hand, you could solve Ex. 21, p. 102 of Kuratowski, but this is **not** required for this homework.