

Topology I, Newberger, Spring 2005

Homework: Sections 26

Due April 7

- I. A. (10 points) Do problem #1(a) page 170. Since there are two topologies on the same set in this problem, specify which one you are talking about when using words like open, closed and compact. I suggest using the notation \mathcal{T} -open, \mathcal{T} -closed and \mathcal{T} -compact, and similarly for \mathcal{T}' .
Start by supposing that $\mathcal{T} \subset \mathcal{T}'$, and that X is \mathcal{T} -compact. Either prove that X is \mathcal{T}' compact, or find a counterexample to show that X need not be \mathcal{T}' compact.
Then suppose that $\mathcal{T} \subset \mathcal{T}'$, and that X is \mathcal{T}' -compact. Either prove that X is \mathcal{T} compact, or find a counterexample to show that X need not be \mathcal{T} compact.
- B. (10 points) Do problem #1(b) page 170. Start by supposing that $\mathcal{T} \subset \mathcal{T}'$, and that X is compact and Hausdorff with respect to both topologies. Then prove that $\mathcal{T}' \subset \mathcal{T}$. Note that these topologies were not necessarily defined by bases; there is no need to introduce the language of bases here.
- II. (10 points) Do problem #2 page 171.
- III. (10 points) Do problem #3 page 171.