

Extra Problems for Homework 7

Math 461, Fall 2006

1. Let M be a manifold of dimension d , and let $U \subset M$ be a non-empty open subset. Prove that U (with the subspace topology) is also a manifold of dimension d .
2. Let M and N be manifolds of dimension c and d , respectively. Prove that $M \times N$ (with the product topology) is a manifold of dimension $(c + d)$.
3. Let $X = \mathbb{R}^2$, with the usual topology induced by the Pythagorean metric. Find an equivalence relation \sim , such that the identification space X/\sim is
 - a) not locally Euclidean (some point of X/\sim has no neighborhood homeomorphic to an open set in \mathbb{R} or \mathbb{R}^2),
 - b) not Hausdorff.