Introduction to Manifold Theory

Homework 2

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1. Do Exercise 2.6 (show that for topological spaces X, Y, Z, the "rearrange-the-parentheses" map from $(X \times Y) \times Z$ to $X \times (Y \times Z)$ is a homeomorphism).

2. Do Exercise 2.7 (show that the product topology and the usual topology on $\mathbb{R}^n$ agree).

3. The following exercises are about the "line with two origins" of Example 2.44, which we will call X.

   (a) Show that the construction in Example 2.44 defines a topology on X.

(b) Show that with this topology, X is locally homeomorphic to R.

(c) Show that X is not Hausdorff.