

Homework 2

Topology I, Math 70700, Fall 2015

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<http://www.math.csi.cuny.edu/~ikofman/topology.html>

Due: Thursday, September 17, before class

Problems

1. Let τ be the standard topology on the unit interval $I = [0, 1]$ and let τ' be another topology on I .
 - (a) Prove that if $\tau' \subsetneq \tau$ then I cannot be Hausdorff with the topology τ' .
 - (b) Prove that if $\tau \subsetneq \tau'$ then I cannot be compact with the topology τ' .
2. Consider the rationals $\mathbb{Q} \subset \mathbb{R}$ with the usual subspace topology.
 - (a) Show that \mathbb{Q} is not locally compact.
 - (b) Show that the one-point compactification $\widehat{\mathbb{Q}}$ is not Hausdorff.
3. Select 10 problems from among the following:
 - Problems # 1 – 7 of Hatcher's notes for Chapter 2 on p.28.
 - Problems # 3, 5 – 12 of Hatcher's notes for Chapter 3 on p.42.