

Homework 3

Due Wednesday, September 27, anytime, on Canvas

Reading. Munkres §16 – §20

Problems.

- §13 #6. Show that the topologies of \mathbb{R}_ℓ and \mathbb{R}_K are not comparable.

These topologies are defined on page 82, and showing that they are not comparable means finding a set that is open in \mathbb{R}_ℓ but not open in \mathbb{R}_K , and finding a set that is open in \mathbb{R}_K but not open in \mathbb{R}_ℓ .

- §16 #1. Show that if Y is a subspace of X , and A is a subset of Y , then the topology A inherits as a subspace of Y is the same as the topology it inherits as a subspace of X .
- §16 #6. Show that the countable collection

$$\{(a, b) \times (c, d) \mid a < b \text{ and } c < d, \text{ and } a, b, c, d \text{ are rational}\}$$

is a basis for \mathbb{R}^2 .

The standard topology on \mathbb{R} is the order topology, and the standard topology on $\mathbb{R}^2 = \mathbb{R} \times \mathbb{R}$ is the product topology.

- §17 #2. Show that if A is closed in Y and Y is closed in X , then A is closed in X .

Recommend Problems (not to turn in).

- §13 #8.
- §16 #4.
- §17 #3.