UF MTG 4302/5316
Introduction to Topology 1
Fall 2023

Homework 1

Due Wednesday, September 6, in class

Reading. Munkres §1 – §7, §9

Problems.

- §5 #3. Let $A = A_1 \times A_2 \times \dots$ and $B = B_1 \times B_2 \times \dots$.

  (a) Show that if $B_i \subset A_i$ for all i, then $B \subset A$.

  (b) Show the converse of (a) holds if B is nonempty.

  (c) Show that if A is nonempty, each A_i is nonempty. Does the converse hold? *Comment: No need to answer this question about the converse.*

  (d) What is the relation between the set $A \cup B$ and the cartesian product of the sets $A_i \cup B_i$? What is the relation between the set $A \cap B$ and the cartesian product of the sets $A_i \cap B_i$? *Comment: No need to prove your answer.*

- §6 #3. Let X be the two-element set $\{0, 1\}$. Find a bijective correspondence between X^ω and a proper subset of itself.

- §6 #4a. Let A be a nonempty finite simply ordered set.

  (a) Show that A has a largest element. [*Hint:* Proceed by induction on the cardinality of A.]

- §7 #3. Let X be the two-element set $\{0, 1\}$. Show there is a bijective correspondence between the set $\mathcal{P}(\mathbb{Z}_+)$ and the cartesian product X^ω.

Recommend Problems (not to turn in).

- §6 #2.
- §7 #4.
- §7 #5ef.