This is a preview of what students will see when they are submitting the assignment. Interactive features are disabled.

Homework Assignment 4

Solve and submit your solutions of the following problems. Note that the late policy is very strict - you will lose 5% for each hour that you are late. In other words, please submit on time!

Due date

Tuesday, October 1, 2024 11:59 pm (Eastern Daylight Time)

Late penalty

5% deducted per hour

Q1 (0 points)

Read sections 17 through 20 in Munkres' textbook (Topology, 2nd edition). Remember that reading math isn't like reading a novel! If you read a novel and miss a few details most likely you'll still understand the novel. But if you miss a few details in a math text, often you'll miss everything that follows. So reading math takes reading and rereading and rerereading and a lot of thought about what you've read. Also, preread sections 22 through 24, just to get a feel for the future.

In addition to the problems below, solve but do not submit your solutions of problems 6, 8, 14, and 19abc on pages 101-102 of Munkres' book, and also problems 7 and 9 on page 111-112.

Q2 (10 points)

(Munkres pp 101 ex 13)

Show that a topological space X is Hausdorff iff the diagonal $\Delta = \{(x, x): x \in X\}$ is closed in $X \times X$.

Q3 (10 points)

(Munkres pp 103 ex 19d)

If U is an open set, is it true that $U = \mathrm{Int}\, \bar{U}$?

Note that in math classes a yes/no question is never just a yes/no question. You are always expected to prove or give a counterexample.

Q4 (10 points)

(Munkres pp 111-112 ex 8)

Let Y be an ordered set taken with the order topology, and assume $f, g: X \to Y$ are continuous.

(a) Sow that the set $\{x: f(x) \leq g(x)\}$ is closed in X.

(b) Let $h(x) := \max(f(x), g(x))$. Show that h is a continuous function.

Q5 (10 points)

Show that if X is a Hausdorff space and if $x_1, \ldots, x_n$ are distinct points of X, then there exist open sets $U_1, \ldots, U_n$ in X such that for every i, $x_i \in U_i$ and such that if $i \neq j$, then $U_i \cap U_j = \emptyset$.

Ready to submit?

- Please ensure all pages are in order and rotated correctly before you submit
- You will not be able to resubmit your work after the due date has passed

Please wait...