

Math 330 Section 1 - Fall 2024 - Homework 09

Published: Tuesday, October 1, 2024

Running total: 35 points

Last submission: Wednesday, October 23, 2024

Status - Reading Assignments:

The reading assignments you were asked to complete before the first one of this HW are:

MF lecture notes:

ch.1; ch.2.1 - 2.6, ch.3; skim ch.4; ch.5 - 9.1

B/G (Beck/Geoghegan) Textbook:

ch.2 - 6.3, ch.9.2

B/K lecture notes:

ch.1.1 (Introduction to sets) (optional)

ch.1.2 (Introduction to Functions) but skip ch.1.2.4: Floor and Ceiling Functions (optional)

New reading assignments:

Reading assignment 1 - due Monday, October 7:

- a. Carefully read MF ch.9.2. Much of it is just a repeat of Ch.3.5.
- b. Extra carefully read MF ch.9.3 until before Theorem 9.7. Convergence and continuity will be address in much more general settings in the chapters on metric and topological spaces and it is important that you are at ease with this material, including proofs!

Reading assignment 2 - due Tuesday, October 8:

- a. Extra carefully read the remainder of MF ch.9.3.
- a. Read B/G ch.8. You already have encountered the material in MF ch.3 and 9.1 - 9.2.

Reading assignment 3 - due Wednesday, October 9:

- a. Carefully read MF ch.9.4 and 9.5.
- a. Carefully read B/G ch.10. You have encountered the material in a more demanding setting in MF ch.9.3.

Written assignments:

Written assignment 1:

Prove lemma 7.1: Let X, Ω be sets such that $X \subsetneq \Omega$ and $\omega \in X^{\complement}$, and let $\mathfrak{B} := \{A \uplus \{\omega\} : A \in 2^X\}$. Then the function $F : 2^X \rightarrow \mathfrak{B}; A \mapsto A \uplus \{\omega\}$ is a bijection.

Written assignment 2:

Prove cor.7.3: If X is uncountable and $A \subseteq X$ is countable then A^{\complement} is uncountable.