Math 330 Section 1 - Fall 2025 - Homework 09

Published: Thursday, October 9, 2025 Running total: 34 points
Last submission: Monday, October 27, 2025

Status - Reading Assignments:

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

MF lecture notes:

ch.1 - 3, skim ch.4, ch.5 - 9.5, ch.11 through Example 11.11

B/G (Beck/Geoghegan) Textbook:

ch.2.1 – 6.3, ch.8, ch.9.1

Other material (optional):

B/K lecture notes ch.1.1 and ch.1.2, except ch.1.2.4
Stewart Calculus 7ed - ch.1.7: "The Precise Definition of a Limit"

New reading assignments:

Reading assignment 1 - due Monday, October 13:

- **a.** Carefully read B/G ch.6.4 and ch.7.1. This corresponds to material in MF ch.6.
- **b.** Carefully read B/G ch.10. This corresponds to material in MF ch.9.1 – 9.3.

Reading assignment 2 - due: Wednesday, October 15:

- **a.** Carefully read MF ch.9.6 and 9.7.
- **b.** Carefully read B/G ch.11. This corresponds to material in MF ch.9.4.

Reading assignment 3 - due Friday, October 17:

- **a.** Carefully read MF ch.9.8 until before Proposition 9.44. and skim the optional remainder.
- **c.** Skip the optional MF ch.9.9 (Sequences of Sets and Indicator functions and their liminf and limsup). The stronger students and those who consider getting a master's degree in probability/statistics/actuarial science are encouraged to study the material, in particular the last remark.

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 $F : 2^X \to \mathfrak{B};\ A \mapsto A \uplus \{\omega\}$ 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.