Math 447 - Fall 2024 - Homework 03

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Status - Reading Assignments:

Here are the reading assignments to be completed before the first one of this HW.

WMS (Wackerly, et al. Textbook):

Nothing assigned yet

MF447 lecture notes:

Ch.1 - 3, ch.4.1 ⋆

Other:

Nothing assigned yet

New reading assignments:

Reading assignment 1 - due Monday, September 2:

a. Carefully read the non–optional part of MF ch.4.2 and understand the other parts sufficiently well to know what is contained in them. In particular, focus on Remark 4.3 (Construction of the Lebesgue integral) Fact 4.1, and Theorem 4.5.
The strong students are encouraged to also study the optional parts with great care.

Reading assignment 2 - due: Wednesday, September 4:

a. Carefully read MF ch.5.1.

Reading assignment 3 - due Friday, September 6:

a. Carefully read MF ch.5.2.
b. Carefully read MF ch.5.3.
c. Carefully read MF ch.5.4 through Remark 5.18.

General note on written assignments: I will not collect those assignments for grading but doing them might be helpful for your quizzes and exams.

(a) Work closed book through the examples given in the new section 3.4 (Series and Integrals as Tools to Compute Probabilities) of MF ver **2024-09-03**.

All integrals in there are given as Riemann integrals.

(b) Write rom memory the following definitions and compare them with the MF lecture notes:

- Step functions and simple functions
- Lebesgue integral for $f \geq 0$. For the strong students: Can you draw a picture that shows how such f is approximated from below by simple functions?
- Properties of the Riemann integral.
- Properties of the Lebesgue integral.
- Monotone and dominated convergence theorems. Write them from memory until you get the assumptions and conclusions right for both of them!
- Really important: Work through the examples given in Problem 4.1.
- Write Fubini's theorems from memory for both Riemann integral and Lebesgue integral.

Selected answers:

None, since all answers to **(a)** can be found in the lecture notes.