MAT320 Problem Set 5

Due Nov 2, 2023

Please write your homework on paper neatly or type it up in LaTeX, and hand it in at the beginning of class next Thursday.

Royden $X.Y.Z$ refers Problem Z in Royden-Fitzpatrick, found in the collection of problems at the end of section $X.Y$.

Problem 1. Royden 3.1.1.
Problem 2. Royden 4.1.2
Problem 3. Royden 4.1.5.
Problem 4. Royden 4.1.8.
Problem 5. Given an example (with proof) of a sequence of nonnegative measurable functions $f_n : [0,1] \to \mathbb{R}$ such that $f_n \to f$ pointwise almost everywhere on $[0,1]$ and

$$\lim_{n\to\infty} \int_0^1 f_n > \int_0^1 f.$$

(note the *strict inequality*.) You may use that piecewise continuous functions are Riemann integrable.
Extra credit. Royden 3.2.21.