# Real Analysis 1, MATH 5210, Fall 2024

## Homework 10, Section 4.2. The Lebesgue Integral of a Bounded Measurable Function over a Set of Finite Measure

Due Saturday, November 23, at 11:59 p.m.

**Write in complete sentences and paragraphs!!!** *Explain* what you are doing and convince me that you understand what you are doing and why. Justify all steps by quoting relevant results from the textbook or hypotheses. Use the notation and techniques described in the in-class hints. Do not discuss homework problems with others. If you have any questions, then contact me (gardnerr@etsu.edu).

**4.9.** (5th Edition) Let $m(E) < \infty$ and $\{E_n\}_{n=1}^{\infty}$ be a measurable partition of $E$. Just using the linearity of integration and the Bounded Convergence Theorem, prove that $m(E) = \sum_{n=1}^{\infty} m(E_n)$.

**4.14.** (4th Edition) Prove that Proposition 4.8 is a special case of the Bounded Convergence Theorem. HINT: Let $|f_n| \le M_n$ on $E$ and $|f| \le M_\infty$ on $E$. Find $M$ as described in the Bounded Convergence Theorem.

**4.16.** (4th Edition) Let $f$ be a nonnegative bounded measurable function on a set $E$ of finite measure. If $\int_E f = 0$ then $f = 0$ a.e. on $E$. Do by contradiction.