

Problem Set 3
January 28, 2024.

1. Exercise 4.2 for Lebesgue measure in \mathbb{R}^n (with $n \in \mathbb{Z}_+$ arbitrary).
2. Exercises 4.6–4.8.
3. Exercises 4.13, 4.14.
4. (a) Show that every Vitali set $V \subset [0, 1]$ has positive Lebesgue outer measure.
(b) Prove that for every $\epsilon > 0$, there exists a Vitali set V_ϵ satisfying $0 < m^*(V_\epsilon) < \epsilon$.
(c) Prove that for every Lebesgue measurable set $A \subset V$, we have $m(A) = 0$.
5. Exercise 4.17.