425A FALL 2020 PROBLEM SET #11

Problem 1. Prove that a countable union of null sets in $\mathbb{R}$ is again a null set. What about an uncountable union?

Problem 2. Let $f : [0,1] \to \mathbb{R}_{>0}$ be a continuous function. Prove that we have $\int_0^1 f(x)dx > 0$. What happens if we assume that f is Riemann integrable but not necessarily continuous?

Problem 3. Pugh (2nd edition) chapter 3 problem 14.

Problem 4. Pugh (2nd edition) chapter 3 problem 27.

Problem 5. Pugh (2nd edition) chapter 3 problem 32.

Problem 6. Pugh (2nd edition) chapter 3 problem 53.

Problem 7 (extra credit)**.** Pugh (2nd edition) chapter 3 problem 29.