MATH 630, Fall 2011, HW 2

1) Prove that Lebesgue measure is finitely additive on the σ-algebra of Lebesgue measurable sets in $\mathbb{R}$.

2) Let $E \subset \mathbb{R}$ satisfy $m^*(E) < \infty$. Construct open interval coverings $\{U_n\}$ and $\{V_n\}$ of $E_1 = E \cap (a, \infty)$ and $E_2 = E \cap (-\infty, a]$, respectively, such that

$$\sum_{n=1}^{\infty} (m(U_n) + m(V_n)) \leq m^*(E) + \epsilon.$$

3) Choose one of the following: Problem 2.3.a, Problem 2.3.b.

4) Choose one of the following: Problem 2.3.c, Problem 2.3.d, Problem 2.4.

5) Choose one of the following: Problem 2.2, Problem 2.8, Problem 2.13.