Homework #5: Due on 11/10 (A proper subset of the problems will be selected for grading.)

A) Solve the following problems from the textbook. 3.14; 3.25 (Assume that $X = \mathbb{R}, \mathcal{A} = \mathcal{M}(\mathbb{R}), \mu = m$); 3.27; 3.28; .

B) Let $f_n(x) = ae^{-na} - be^{-bnx}$ for $x > 0$ and $0 < a < b$.
B-1) Prove that $\sum_{n=1}^{\infty} \int_0^{\infty} |f_n(x)|dx = \infty$.
B-2) Prove that $\sum_{n=1}^{\infty} \int_0^{\infty} f_n(x)dx = 0$.
B-3) Prove that $\sum_{n=1}^{\infty} f_n(x) \in L^1_m([0, \infty))$, and $\int_0^{\infty} \sum_{n=1}^{\infty} f_n(x)dx = \ln(b/a)$.

C) Solve the following problems from the supplement text posted on Canvas and only solve the problems for $\mathbb{R}^d = \mathbb{R}$, i.e., $d = 1$: 2.4.32, 2.5.12; 2.7.23; 2.7.30; 2.7.34; 2.736; 2.7.37.