MATH 650. HOMEWORK 9. DUE: 10/24/02

Problem 2.2.2. Let J be the interval $[1, \infty)$. Show that

$$\int_J \frac{1}{x} dx = +\infty$$

using only properties of the Lebesgue integral discussed in 2.2.

Problem 2.2.4. Let H_n be the number of heads occurring in the first n trials of a Bernoulli sequence. Compute its expected value and variance.

Problem 2.2.8. Let $X = \{x_1, x_2, \cdots\}$ be a countable set, and let $P_1, P_2, \cdots$ be nonnegative numbers such that $\sum P_i = 1$. For $A \subset X$ let

$$\mu(A) = \sum_{x_i \in A} P_i$$

Then μ is a probability measure on the σ-field of all subsets of X. Show that every function $f : X \to [-\infty, +\infty]$ is measurable, and for f nonnegative

$$\int_X f\mu = \sum f(x_i) P_i$$