Assignment #9

Due on Friday February 29, 2008

Read Section 4.1 on *The Expectation of a Random Variable,* pp. 181–188, in DeGroot and Schervish.

Do the following problems

1. Let $X \sim \text{Uniform}(a, b)$ and compute $E(X)$.

2. Let X be a continuous random variable with pdf

$$f_X(x) = \frac{1}{\pi(x^2 + 1)} \text{ where } x \in \mathbb{R}.$$

   Show that X has no expectation.

3. Suppose that X is a **bounded** and continuous random variable; that is, there exists a positive number M such that

$$\Pr(|X| \leqslant M) = 1.$$

   Show that $E(X)$ exists. In other words, show that

$$\int_{-\infty}^{\infty} |x| f_X(x) \ \mathrm{d}x < \infty.$$

4. Exercise 7 on page 188 in the text

5. Exercise 9 on page 189 in the text