

Assignment #11

Due on Wednesday March 5, 2008

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

Do the following problems

1. An experiment consists of tossing a fair coin twice in a row. Let E_1 denote the event that a head comes up on the first toss, E_2 denote the event of heads on the second toss, and E_3 denote the event that exactly one head is thrown. Verify that E_1 , E_2 and E_3 are pairwise independent but that

$$\Pr(E_3 | E_1 \cap E_2) \neq \Pr(E_3).$$

Conclude therefore that the events E_1 , E_2 and E_3 are not mutually independent.

2. Let X have the pdf $f_X(x) = 3x^2$ for $0 < x < 1$, zero elsewhere. Consider a random rectangle whose sides are X and $1 - X$. Determine the expected value of the area of the rectangle.
3. Exercise 3 on page 188 in the text
4. Exercise 4 on page 188 in the text
5. Exercise 5 on page 188 in the text