Probability (MATH 4733 - 01) Fall 2011
Exam 2 - Practice Problems

Due: never, but think Wed., Nov 9.

In the wild

X and Y denote random variables, discrete or continuous.

1. T F $E(X+Y) = E(X) + E(Y)$
2. T F If X and Y are independent, then $E(XY) = E(X)E(Y)$.
3. T F $Var(X+Y) = Var(X) + Var(Y)$
4. T F If X and Y are independent, then $F_{X+Y}(t) = F_X(t) + F_Y(t)$.
5. Suppose X is continuous. Define $E(X)$.
6. Define $Var(X)$.
7. Suppose X is continuous. Define the pdf of X. (**Bonus:** What to the letters "pdf" stand for?)
8. Let X be a binomial random variable with parameters (n, p), i.e., the number of successes on n independent random trials each with success probability p. Determine

   (a) the pdf of X;

   (b) the cdf of X;

   (c) $E(X)$;

   (d) $Var(X)$.

   Show your work for (b)(c)(d).
9. Repeat the above problem when X is a hypergeometric random variable with parameters (n, r, w), i.e., the number of red balls in n draws (without replacement) from an urn with r red balls and w white balls.
10. Repeat the above problem when X is the exponential distribution with pdf $\lambda e^{-\lambda x}$ $(\lambda > 0, x > 0)$.
11. Repeat the above problem when $X = Y^2$ where Y is a continuous random variable with uniform distribution on $[0, 1]$.
12. Suppose X_i is the face value of a die on the i roll. Find the pdf of $X_1 + X_2$.
13. Let X be a continuous random variable with the uniform distribution on $[0, 1]$. Let X_1, X_2, X_3 be a random sample of size 3. Find the mean and median for the 1st order statistic $X_{min} = X'_1$.

By the book

Section 3.7: 13, 15, 21, 28, 43

Section 3.8: 2

Section 3.9: 1, 3, 6, 11, 14, 20

Section 3.10: 1, 3