Statistics 394, Problem Set 8

Wellner; 2/23/2000

Reading:	Kelly, Chapter 4, Sections 4.1 - 4.4; Chapter 6, Sections 6.3 and 6.4.
Optional Web Reading:	Section I.D.1,2,3,5 Expected Value; Variance, Correlation; Conditional Expected value at http://www.math.uah.edu/stat/expect/index.html .
Due:	Wednesday, March 1, 2000.

1. K, 4.2, # 3, page 256.
2. K, 4.2, # 4, page 256.
3. K, 4.2, # 8, page 257.
4. K, 4.2, # 16, page 258.
5. K, 4.3, # 1, page 268.
6. K, 4.3, # 2, page 268.
7. K, 4.3, # 3, page 269. (Note that there are two way to do this: (i) direct calculation; (ii) recognize the given density as that of a sum of two independent random variables with a distribution we have already studied.)
8. Bonus Problem 1: K, 4.2, # 9, page 257.
9. Bonus Problem 2: Look at the Ball and Urn Experiment at the Virtual Laboratories website:

   `http://www.math.uah.edu/stat/urn/index.html`

   (a) Find a formula for the variance of the total number of red balls in a sample of size n drawn without replacement from an urn containing R red balls and a total of N balls.
   (b) Find the corresponding variance when the sampling is carried out *with* replacement.
   (c) For the sampling without replacement part of this experiment, with $N = 60$ and $R = 20$, verify the claim that the standard deviation of Y, the number of red balls in $n = 10$ draws from the urn, is 1.37.

10. Bonus Problem 3: For each of the following problems on Problem Set 7, compute the variance of the random variables with the given distributions and sketch the mass or density function: problem # 2 (K 4.1, #3); problem # 3 (K 4.1, #5); problem # 4 (K 4.1, #7).