Homework 3
Math 611 Probability

due Monday Oct. 16 2006 in class

From your textbook do the following exercises:
     Chapter 2 page 87 Problems 37, 42, 48, 56, 57.
In addition do the following problems (featured in last year's Midterm):

(1) We know that the random variables X and Y have joint density $f(x, y)$. Assume that $\mathbf{P}(Y = 0) = 0$. Find the densities of the following variables:

  (a) $X + Y$

  (b) $X - Y$

  (c) XY

  (d) $\frac{X}{Y}$

(2) Give a counterexample to the statement $\mathbf{E}(XY) = \mathbf{E}(X)\mathbf{E}(Y)$ implies that X and Y are independent.

(3) Ali Baba is caught by the sultan while stealing his daughter. The sultan is being gentle with him and he offers Ali Baba a chance to regain his liberty.

   There are 2 urns and m white balls and n black balls. Ali Baba has to put the balls in the 2 urns however he likes such that no urn is empty. After that the sultan will chose an urn at random then pick a ball from that urn. If the chosen ball is white Ali Baba is free to go, otherwise Ali Baba's head will be at the same level as his legs.

   How should Ali Baba divide the balls to maximize his chance of survival?