EE342 Spring 2007
Problem Set 7
due 4/2

1) Ross Chapter 6 #20, #23, #39, #42.

2) An urn contains six blue balls and three red balls. Balls are drawn at random without replacement until the first blue ball is drawn. Let $X$ be the random variable describing the total number of balls that are drawn. After the first blue ball is drawn, balls continue to be drawn at random without replacement from the same urn until the second blue ball is drawn. Let $Y$ be the random variable describing the number of balls drawn after the first blue ball is drawn.

a) Find the joint pmf of $X$ and $Y$ along with the marginal pmfs of $X$ and $Y$.

b) Are $X$ and $Y$ independent?

c) Compute the $E(X)$, $E(Y)$, $\text{VAR}(X)$, $\text{VAR}(Y)$, and $\text{COV}(X,Y)$. Are $X$ and $Y$ uncorrelated?

d) Simulate $X$ and $Y$ on matlab. Compute the sample statistics of c) by drawing 10000 random samples from $X$ and $Y$. Comment on your observations.

3) Let $X$, and $Y$ be independent and identically distributed exponential random variables with parameter $\lambda$.

a) Find the pdf of $Z = X + Y$. Plot the pdf. Confirm this is the pdf by taking random samples using matlab.

b) Repeat a) for $W = X - Y$.

c) Repeat a) for $V = \max(X,Y)$. 