HW 6B

Sec. 5.2 in the text

1. In a gambling game a woman is paid \$3 if she draws a Jack or a Queen and is paid \$5 if she draws a King or an Ace from an ordinary deck of 52 cards. If she draws any other card she does not win anything. How much should the woman pay to play the game if the game is to be a "fair" game? (A "fair" game is a game defined as a game with Expected Value = 0).

2. If X is a random variable uniformly distributed over (1,3), find the expected value of the random variable Z, where $Z=e^X$.

3. Two evenly matched baseball teams are playing a series of games in which the winner of the series will be the first team to win 4 games. What is the mathematical expectation of the number of games ?

4. Suppose X is uniformly distributed on the interval (3,5). Find $E(X^3)$.

5. A couple decides to have children until they have a girl or until they have a total of 3 children. Find the mathematical expectation of

   a) the number of boys they will have

   b) the number of girls they will have

6. A restaurant serves three fixed-price dinners costing \$12, \$15, and \$20. For a randomly selected couple dining at this restaurant, let X= the cost of the man's dinner and let Y= the cost of the woman's dinner. The joint pmf of X and Y is given in the following table:

$p(x, y)$		y = 12	15	20
x	12	.05	.05	.10
	15	.05	.10	.35
	20	0	.20	.10

   a) Compute the marginal pmf's of X and Y.

   b) What is the probability that the man's and the woman's dinner cost at most \$15 each?

   c) Are X and Y independent? Justify your answer.

   d) What is the expected total cost of the dinner for the two people?

7. Ten married couples are seated randomly in a circle.
   Find the expected number of wives sitting next to their husbands.

Hint: Let X be the r.v. the number of wives seated next to their husbands.

Let W_i = wife i ; i=1,2,...10

Let $X_i = 1$ if W_i is sitting next to her husband for i=1,2,...10

and $X_i = 0$ if W_i is NOT sitting next to her husband for i=1,2,...10

Then $X= X_1 + X_2 + ... + X_{10}$.

8. If 100 balls are tossed at random into 50 boxes, find the expected number of empty boxes.

   Hint: Use an approach similar to that in Problem 7.