14:332:312 Discrete Math

Homework Assignment 4 (100 points)

Due April 19 at start of class

(need to explain your results)

1) *(15 points)* In an urn there are 4 white marbles, 3 red marbles and 5 blue marbles. The sample space of this experiment is equi-probable. What is the probability ***p*** that a *red* marble appears in a random drawing from this urn.

2) *(20 points)* A pair of dice is tossed, with the sample space *S* of this experiment consisting of 36 ordered pairs (***a, b***). Here ***a*** and ***b*** can be any integer from 1 to 6.
   a) What is the probability of any point (***a, b***) in the space?
   b) What is the conditional probability ***P(A|E)*** where A ={2 appears on at least one die} and E={the sum of both dice is 6};

3) *(15 points)* A lot contains 14 items, of which 3 are defective. From this lot, 4 items are drawn at random, one after the other (and not put back in the lot). What is the probability ***p*** that all items removed are non-defective.

4) *(20 points)* Consider the following Bernoulli Trial: A fair coin is tossed 6 times and Heads is considered a success.
   a) What is the probability that exactly two heads occurs?
   b) What is the probability of getting no heads (all tosses are failures)?

5) *(15 points)* Three horses named Smith, Glory and Gypsy are racing. Their respective probability of winning is ½, 1/3 and 1/6. The random variable X denotes the payoff function for the winning horse. If Smith wins, X pays $200, if Glory wins, the payoff is $400 and if the least probable horse wins, then X pays $800. What is the expected value of X, that is what is the expected payoff for the race?

6) *(15 points)* A course has an enrollment of 10 students. A committee of 3 is chosen at random to represent the class. Find the probability that:
   a) A belongs to the committee;
   b) A and B belong to the committee;
   c) A or B belong to the committee.