***Homework Set #3***

1. There are two identical bowls full of cookies cooling off in the kitchen. Bowl I contains 40 cookies of which 10 are chocolate chip and 30 are plain. Bowl II also contains 40 cookies of which 20 are chocolate chip and 20 are plain. Skeezyx the dog smells the cookies and selects a bowl at random and munches down on a random cookie. Suppose Skeezyx selects a plain cookie (chocolate is bad for dogs) what is the probability that the cookie was selected from bowl I?
2. An insurance company has conducted an audit of their automobile accident claims. They found that their poor drivers had a probability of 0.30 of being involved in an accident in any given year. They found that their average drivers had a probability of 0.15 of being involved in an accident in any given year and that their good drivers had a probability of 0.05 of being involved in an accident in any given year. 20% of their policy holders were considered poor drivers, 70% were considered average drivers and 10% were considered good drivers. If a policy holder has an accident find the probability that the policy holder is a good driver.
3. In Interior Alaska, FAA plane crash records indicate that 30 % of the plane crashes occur in the Brooks Range, 60% of the crashes occur in the Tanana Flats and 10% of the crashes occur in the water off the coast. They also found that if a plane crashes in the Brooks Range there is a probability of 0.65 that a search party will successfully find the plane. If a plane crashes in the Tanana Flats, there is a probability of 0.95 that a search party will successfully find the plane and if a plane crashes in the water off the coast, there is a probability of 0.35 that a search party will successfully find the plane. Suppose now that a plane has crashed in Interior Alaska and a search of the Brooks Range was unsuccessful in finding the plane, find the probability that the plane has nevertheless crashed in the Brooks Range.
4. Three prisoners are awaiting execution in a prison when they hear the news that two of the prisoners will be released at the command of the Commandant. One of the prisoners asks the guard to tell him the name of one of the other prisoners who will be released since he already knows that at least one of those prisoners will be released. The guard thinks for a while and then finally refuses to answer the question. He tells the prisoner “Right now you are one of three prisoners, two of whom are to be released, so your probability of being executed is 1/3. If I tell you the name of one of the other prisoners who will be release, you will then be one of two prisoners, one of whom will be executed and your probability of being executed will go up to 1⁄2.” Is the guards reasoning correct? Suppose the three prisoners are named A, B and C and suppose prisoner A is the one asking the question of the guard. Calculate the probability that prisoner A will be executed if the guard tells A that prisoner B will be one of those to be set free. Assume the following of the guard. He doesn’t lie. If A is the prisoner who will be executed, the guard can choose to tell A that either B or C will be released with equal probability. If A is one of the prisoners who will be released then the guard will have to tell A the name of the one remaining released prisoner with probability one.
5. In Problem 2 find the unconditional probability that a policy holder of the Insurance Company selected at random has had an accident.