STA2001 Probability and statistical Inference I
Tutorial 1

1. An insurance company looks at its auto insurance customers and finds that (a) all insure at least one car, (b) 90% insure more than one car (c)25% insure a sports car, and (d) 15% insure more than one car, including a sports car. Find the probability that a customer selected at random insures exactly one car and it is not a sports car.

2. 1.2-4. The "eating clu" is hosting a make-your-own sundae at which the following are provided:

Ice Cream Flavors	Toppins
Chocolate	caramel
Cookies 'n' cream	Hot fudge
Strawberry	Marshmallow
Vanilla	M&Ms
	Nuts
	Strawberries

(a) How many sundaes are possible using one flavor of ice cream and three different toppings?
(b) How many sundaes are possible using one flavor of ice cream and from zero to six (different) toppings?
(c) How many different combinations of flavors of three scoops of ice cream are possible if it is permissible to make all three scoops the same flavor?

3. 1.2-7. In a state lottery, four digits are drawn at random one at a time with replacement from 0 to 9. Suppose that you win if any permutation of your selected integers is drawn. Give the probability of winning if you select
   (a) 6, 7, 8, 9.
   (b) 6, 7, 8, 8.
   (c) 7, 7, 8, 8.
   (d) 7, 8, 8, 8.

4. 1.2-9. The World Series in baseball continues until either the American League team or the National League team wins four games. How many different orders are possible (e.g., $ANNAAA$ means the American League team wins in six games) if the series goes
   (a) Four games?
   (b) Five games?
   (c) Six games?
   (d) Seven games?

5. (1.3-12) You are a member of a class of 30 students. A bowl contains 30 chips: 2 blue and 28 red. Each student is to take 1 chip from the bowl without replacement. The student who draws the blue chip is guaranteed an A for the course.

   (a) If you have a choice of drawing first, tenth, twentieth or last, which position would you choose? Justify your choice on the basis of probability.**(What is the probability to get A when you are in the 10th position?)**

   (b) Suppose the bowl contains 4 blue and 26 red chips. What position would you now choose?

6. (1.5-7.) A chemist wishes to detect an impurity in a certain compound that she is making. There is a test that detects an impurity with probability 0.90; however, this test indicates that an impurity is there when it is not about 5% of the time. The chemist produces compounds with the impurity about 20% of the time; that is, 80% do not have the impurity. A compound is selected at random from the chemists output. The test indicates that an impurity is present. What is the conditional probability that the compound actually has an impurity?

7. Suppose we have 5 fair coins and 10 unfair coins, which look the same and feel the same. For the fair coins, there is a 50% chance of getting heads and of course 50%chance of getting tails. For the unfair coins, there is a 80% probability of getting heads and 20% tails. Now we randomly pick one coin from all 15 coins and flip it for 6 times. Then we get 4 heads. What is the probability that we have pick a fair coin?

8. (1.3-6) A researcher finnds that, of 982 men who died in 2002, 221 died from some heart disease. Also, of the 982 men, 334 had at least one parent who had some heart disease. Of the latter 334 men, 111 died from some heart disease, A man is selected from the group of 982. Given that neither of his parents had some heart disease, find the conditional probability that this man died of some heart disease.