1) Determine the sample space for the following experiments:
a) Last digit of Social Insurance Number S={0,1,2,3,4,5,6,7,8,9}

b) Seatbelt experiments with 3 drivers checked S={RRR,RRU, RUR,RUU,URR,URU, UUR,UUU}

c)Is cereal in stock? Check the stores until you find the first store with the cereal you look. S={Y, NY, NNY,NNNY, ...} This sample space contains infinite many outcomes.

2) Consider an experiment with the sample space S=a,b,c,d,e,f,g,h,i,j,k} and the events $A = \{a, c, e, g\}, B = \{b, c, f, j, k\}, C = \{c, f, g, h, i\}, D = \{a, b, d, e, g, h, j, k\}$

Find $A \cap B \cap C$, $(A \cap B \cap C)^c$, $A^c \cup B^c \cup C^c$.

3) From question 3, we observe an intersting fact which is called De Morgan Rule.
$(A_1 \cup A_2 \cup \cdots \cup A_n)^c = A_1^c \cap A_2^c \cap \cdots \cap A_n^c$

$(A_1 \cap A_2 \cap \cdots \cap A_n)^c = A_1^c \cup A_2^c \cup \cdots \cup A_n^c$

4)A Bank has 5 tellers: 1 and 2 are trainees; 3, 4 and 5 are veterans. Teller 2, 3, and 4 are female, and tellers 1 and 5 are males. At the end of the day, two tellers will be randomly selected and all of the transactions of the day will be audited.

a) What is the probability that both trainees will be selected for the audit?

b) What is the probability that one male and one female will be selected?

c) What is the probability that two females will be selected?

5) A bagel store sells two types of bagels: plain (p) and cinnamon (C). The owner believes the demand for each type is equal. Five customers are selected at random. Each one buys only one bagle.

a) What is the probability that exactly one person buys a plain bagel.

b) Suppose all five buy a plain bagel. Is there any evidence to suggest that the demand is weighted more toward one variety?

6. Three officers are assigned to cases randomly. The outcome 132 means officer 1 is assigned to case 1, officer 3 is assigned to case 2, and officer 2 is assigned to case 3.

a) Find the probability that all three cases are assigned to different officers.

b) Find the probability that officer 2 is not assigned to any of the three cases.

c) Find the probability that officer 2 is assigned to at least one case.

7. 70% of people put sugar in their coffee, 35% put milk, and 25% put both. A person is selected at random.

a) What is the prob that the person uses at least one of the two items?

b) What is the prob that the person uses neither?

c) What is the prob that the person uses only sugar?

d) What is the prob that the person only uses one item?

Examples of multiplication rules for stagewise experiments:

8) A home theatre consists of a receiver, a speaker, a blue-ray player. The store sells 7 types of receiver, 12 types of speakers, 9 different players. How many different systems can be constructed?

9) A license plate consists of three letters and three numbers? How many different plates are possible? How many plates end as 123?

Examples of permutation rules:

10) There are 12 players in the tournament. The result is the order the first three players. For example (1, 10, 2) means the first player is the first place, the 10th is the second place, and the second player wins the third place.

a) How many different results are possible?

b) What is the probability of a result that either player 4 or player 5 are in the first place?

c) What is the probability that player 9 is not in the first three places?