Seminar 3

1. A company receives a shipment of 25 hard drives. Before accepting the shipment, 6 of them will be randomly selected and tested. Only if all 6 meet specifications, will the shipment be accepted. 4 of the 25 drives (of the shipment) are defective, what is the probability that the shipment will not be accepted?

2. In a bag there are marbles numbered from 0 to 5:

Number on the marble	0	1	2	3	4	5
Frequency (in the bag)	9	11	12	13	14	11

4 marbles are drawn randomly without replacement. Let X_k denote the k-th drawn number, $k = \overline{1,4}$. Compute the following probabilities:

(a) $P(X_1 = 1, X_2 = 2, X_3 = 3, X_4 = 4)$;
(b) $P(\{X_1 = X_2 = 0\} \cap \{X_3 = X_4 = 5\})$;
(c) $P(\{X_1 = X_2 = X_3\} \cap \{X_2 < 2\})$;
(d) $P(\{X_1 \neq 1\} \cup \{X_2 \neq 2\} \cup \{X_3 \neq 3\})$;
(e) $P(X_3 = X_4 = 1 | X_1 = X_2 = 1)$.

3. Let M be a subset with 3 randomly chosen (without replacement) elements of the set $\{2, 3, 4, 5, 6\}$ and N be a subset with 2 randomly chosen (without replacement) elements of the set $\{0, 1, 7, 8\}$. Let $U = M \cup N$. Compute the probabilities of the following events:
A:"U contains only odd numbers."
B:"U contains only consecutive numbers."
C:"$\{0, 4\} \subset U$."
D:"U contains at least two even numbers."

4. A person rolls a die and tosses a coin.
a) Write a sample space for this experiment.
b) What is the probability of the event E:"the person obtains the number 6 **or** heads"?

5. 9 persons get randomly on a train with 3 cars. Compute the probabilities of the following events:
A: "There are exactly 3 persons in the first car."
B: "There are 3 persons in each car."
C: "There is 1 person in a car and there are 4 persons in each of the other two cars."
D: "There is at least a person in each car."