Introduction to Probability

Tutorial 6

1. A student has to sit for an examination consisting of 3 questions selected randomly from a list of 100 questions. To pass, he needs to answer all three questions. What is the probability that the student will pass the examination if he knows the answers to 90 questions on the list?

2. Show that $\binom{n}{k} = \binom{n-1}{k} + \binom{n-1}{k-1}$. Can you provide an interpretation of this equality?

3. In a series of 1000 light bulbs, 2% are defective. What is the probability that among 20 bulbs bought, there are 2 faulty ones?

4. A menu has 5 appetizers, 3 soups, 7 main courses, 6 salad dressings and 8 desserts. In how many ways can a full meal be chosen? In how many ways can a meal be chosen if either an appetizer or a soup is ordered, but not both?

5. In how many ways can 6 people sit in 6 seats in a line at a cinema? In how many ways can the 6 people sit around a dinner table eating pizza after the movie?

6. Is it true that the number of ways of choosing five different letters from the alphabet is more than the number of seconds in a year?