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Midterm Test 1

1. A stick of length one meter is randomly broken into two parts. What is the probability that from the obtained parts and from a new stick of half a meter length a triangle can be formed?
2. In a box we have 8 cards numbered from 1 to 8. A card is chosen randomly. Let events A, B and C denote the following:
  - a. A: the chosen number is even;
  - b. B: the chosen number is not greater than 4;
  - c. C: the chosen number is either 2 or greater than 5.

Show that  $P(ABC) = P(A)P(B)P(C)$  and the three events are not mutually independent.

3. Two dice are rolled. Find the probability that the sum of the two numbers obtained is less than 5 given the sum is even.
4. Rust Rider cars are produced in four factories. The first factory produces 200 cars per day, the second 320, the third 270, while the fourth 210. The refuse ratios for the factories are 2%; 5%; 3% and 1%, respectively. We bought a Rust Rider and we found it perfect. What is the probability that it had been produced in the fourth factory?
5. Write down the Bayes' theorem!
6. Write down the definition of independence!