MAT 271E – Homework 1

Due 23.02.2011

1. You toss a coin repeatedly, until a 'Head' occurs. Propose a sample space for this experiment.

2. In a class, 40% of the students wear glasses, 70% wear a ring and 20% wear neither rings nor glasses. Compute the probability that a randomly chosen student

   (a) wears a ring or glasses,

   (b) wears glasses and a ring,

   (c) wears a ring but doesn't wear glasses.

3. A fair die is rolled twice and we assume that all thirty-six possible outcomes are equally likely. Let X and Y be the result of the 1st and the 2nd roll, respectively. Let A, B be events defined as,

$$A = \{X + Y \geq 9\}, \qquad B = \{\min(X, Y) \leq 4\}.$$

   Compute $\mathbf{P}(A|B)$.

4. (a) Suppose that two castles are placed randomly on a chess board. Compute the probability that they cannot capture each other.

   (b) Suppose that three castles are placed randomly on a chess board. Compute the probability that none of them can capture another.

5. Suppose that a student is successful in an exam,

   • with probability 0.3, if she eats honey for breakfast on the day of the exam and doesn't study,

   • with probability 0.9, if she studies.

   Assume also that she is not successful if neither of the two conditions above are satisfied. Suppose she eats honey on the day of the exam with probability 0.3. Also, suppose that with probability 0.4, she studies. Also, let 0.4 be the probability that she doesn't eat honey and doesn't study. Given that she was succesful, compute the probability that she had honey for breakfast but didn't study.