A3 Sample Midterm Test - Probability

1. Let A and B be two independent events with $\mathbf{P}(A) = 0.6$ and $\mathbf{P}(B) = 0.4$. Determine $\mathbf{P}(B \setminus A)$ and $\mathbf{P}(A \cup B^C) =?$ (B^C is the complement of the event B)

2. A statistics course is visited by students of four different faculties: 4 math., 5 economy, 6 sociology, and 7 biology students. How many different ways 5 students of this course can be delegated to a meeting in such a way that students of all the four faculties be represented?

3. Two cooks, A and B bake a special kind of cake, and with respective probabilities 0.03 and 0.06 it fails to rise. In the restaurant where they work, A bakes 60% of these cakes and B bakes 40%. What proportion of "failures" is caused by A? (Hint, use Bayes' theorem)

4. On a multiple choice exam with 4 possible answers for each of the 20 questions, what is the probability that a student would get 18 or more correct answers just by guessing? You do not have to calculate the probability exactly, enough just to explain the formula. The exact probability can be approximated using a Poisson distribution. How and what is the approximate value?

5. An ordinary deck of 52 cards is shuffled. What is the probability that the top four cards have different suits?

6. Urn A contains 3 red and 3 black balls, whereas urn B contains 4 red and 6 black balls. If a ball is randomly selected from each urn, what is the probability that the balls will be the same color?