Homework #2

You write your solutions on paper by yourself, scan (or photo capture through a mobile application such as CamScanner) and submit them as a single .pdf file. Your solutions have to be handwritten. **Solutions must be submitted electronically before 23.59 on November 23**. No credit will be given to solutions obtained verbatim from the Internet or other sources.

1. We draw cards from an ordinary deck of 52 playing cards. The cards are to be drawn successively at random and without replacement. What is the probability that the third spade appears on the sixth draw?

2. Suppose 50% of the people in a community has a particular disease and there is a fairly accurate diagnostic test for it. 96% of the time this test gives a positive result for the people having this disease, and 92% of the time this test gives a negative result for the people not having this disease. What is the probability that a person, who had a positive result from the test, has the disease?

3. Solve the recurrence relation $a_n = 7a_{n-1} - 12a_{n-2}$ where $n \geq 2$, $a_0 = 5$, $a_1 = 18$

4. Let $n \in \mathbb{Z}^+$ and $n \leq 500$. How many such n are there which are not divisible by 3, 5, and 8?