Discrete Mathematics and Probability

Tutorial 6

(1) Discuss your last tutorial/homework/class test with your peers.

(2) A discrete random variable X has the following probability mass function:

x_i	1	3	4	6
p_i	0.25	0.3	0.3	0.15

Compute the cumulative distribution function, and the probability $P(2 \leq X \leq 5)$. Plot the probability mass function and the cumulative distribution function.

(3) Alice and Bob play take turns throwing a six-sided die. The first one to throw a 5 or 6 wins. Alice starts. What are the probability of the events $A = \{\text{Alice wins}\}$ and $B = \{\text{Bob wins}\}$?
(You may use the fact that $\frac{1}{1-x^2} = 1 + x^2 + x^4 + x^6 + x^8 + \cdots$.)

(4) An exam has 4 questions. Each question has 4 answers, of which exactly 1 is correct. The exam is given to 256 students. Each student answers each question randomly. Describe the distribution of the number of correct answers, i.e. how many exams have 0 correct answers, how many exams have 1 correct answer, etc.