TUTORIAL 2

Question 1. A 0-1 bit string of length 4 is generated randomly so that each of 16 strings is equally likely. Let A be the event that the string starts with 1. Let B be the event that the string contains an even number of 1's. Are A and B independent? Justify your answer.

Question 2. Let A and B be independent events. Prove that the events A and B^c are independent.
Hint: Use the equation $P(A) = P(A \cap B) + P(A \cap B^c)$ to show that $P(A \cap B^c) = P(A)P(B^c)$.

Question 3. A fair dice is rolled repeatedly until a six shows up. What is the probability that at least 5, but not more than 10 rolls are required?

Question 4. A hand of 5 cards is drawn randomly from a standard deck of 52 cards. Let X be the number of hearts contained in the hand of 5 cards.

(a) Find the set of possible values of X.

(b) Write down the PMF and the CDF of X, that is, find $p(x)$ and $F(x)$ for all the values x in part (a).