1. What is the difference between joint distribution and marginal distribution. And how do you define the joint distribution function of two discrete and continuous random variables.

2. Define Covariance and correlation, and how can these be derived from the joint distribution functions.

3. In the table below, the number of the people (per 100 000 population, per year) that smoked cigarettes and had lungs cancer is presented. The random variable X is one (not smoking) or zero (smoking) and variable Y is 1 (healthy) and 0 (ill). What are the joint distribution and marginal functions? Calculate:

	smoking	not smoking
ill	80	8
not ill	44920	54992

   a) the probability that if a person is ill it was caused by cigarettes,
   b) is he/she smokes that has lungs cancer,
   c) correlation between X and Y,

4. Lets throw two symmetric dice. Let X be the number of 6s we get, and Y the number of 1s. Find: a) Joint distribution of random variables (X, Y) and random variables X and Y. Are they independent? b) correlation between X and Y.

5. Let X be random variable with distribution in the table. Random variable $Y = X^2$. Are X and Y dependent? Calculate covariance between X and Y.

X	-1	0	1
p	1/3	1/3	1/3

6. Suppose x is a continuous random variable with the following probability density function: $f(x) = 3x^2$, for $0 < x < 1$. Use the change of variables technique to find the probability density function of $Y = X^2$.