

Mathematical Probability, Math 411, Homework 4

From the textbook solve the problems 13,14,16,18,21,31,32,38, 39 and 40 at the end of the Chapter 2.

And also the problems below:

Problem 1. Let X be a Binomial random variable with parameters 50 and 0.2. What is the probability of the event that $X \leq 5$ (you don't have to simplify the expression).

Problem 2. In a certain soccer tournament you are playing once with each of the other nine teams. In every match you get 3 points if you win, 1 point for a draw and 0 points if you lose. For each match the probability you win is 0.5, the probability you draw is 0.2 and the probability you lose is 0.3, independently of the results of all other matches. What is the probability you finish the tournament with at least 20 points?

Problem 3. If X is a Bernoulli random variable with parameter p , show that $Y = 1 - X$ is also a Bernoulli random variable. What is its parameter?

Problem 4. If X is a Binomial random variable with parameters n and p , show that $Y = n - X$ is also a Binomial random variable. What are the parameters of Y ?

Problem 5. Let X be a Binomial random variable with parameters n and $1/2$. Find the probability mass function of the random variable Y which can have values 0 and 1 and is defined as the remainder when we divide X by 2. Show that this probability mass function does not depend on n .