

Bus 273: Statistical Analysis for Business

Fall 2014

PROBLEM SHEET # 8

Problem 1: A fish basin (balık havuzu) contains 30% bluefish (lüfer) and 70% bream (çupra). Three fish are randomly caught (randomly selected without replacement). Let X = number of bream among the three.

- Suppose the basin is small and contains only 10 fish (3 bluefish, 7 bream). What is the distribution of X ? (Give reasons for your answer. Write the expression for $P(X = i)$, with all numbers substituted correctly.)
- In the case of (a), write the probability that one fish is a bluefish and two are breams.
- Now suppose the basin contains 100 fish (30 bluefish, 70 bream). Which discrete distribution can be used as an approximation for the distribution of X ? (Give reasons for your answer. Give the values of all parameters.)
- How should the fish be caught (how should they be randomly selected) so that the distribution in (c) is the *precise* distribution of X ?

Problem 2: An insurance company (the *Sir Huckleberry Insurance Company*) offers a policy against frustration in lottery. The conditions of the insurance policy are:

- You select which six numbers to play for 52 consecutive weeks in a national lottery you choose.
- If, during these 52 weeks, your chosen numbers don't even produce a twin match (double, two hits), send your lottery tickets to the insurance company and you will receive 10000 euros from the insurance company.

The premium for this insurance company is 28 euros.

- If you play a lottery 6/49, compute the probability that the insurance amount will be paid out.
- If you play a lottery 6/45 (available, for example, in Austria), compute the probability that the insurance amount will be paid out.