

Bus 273: Statistical Analysis for Business

Fall 2009

PROBLEM SHEET # 9

Problem 1: Cans of soft drinks cost \$0.30 in a certain vending machine. What is the expected value and variance of daily revenue Y from the machine, if X , the number of cans sold per day, has $E(X) = 125$ and $\text{var}(X) = 50$?

Problem 2: A random sample of 100 observations is to be drawn from a normally distributed population with a mean of 40 and a standard deviation of 25. Compute the probability that the mean of the sample will exceed 45.

Problem 3: Severe earthquakes occur according to a Poisson process with intensity $\lambda = 0.2/\text{year}$ in a certain geographical region.

- a) What is the expected time between two successive severe earthquakes?
- b) Compute the probability that there will be no severe earthquake during the next 10 years.

Problem 4: Suppose that the price of a stock six months ahead of now, V_1 , is distributed according to $V_1 = X \cdot V_0$, where V_0 is today's price, and X is a lognormally distributed random factor with parameters $\mu = 0$ and $\sigma^2 = 0.11$. Compute the probability that the price of this stock increases by at least 50% in six months.

Problem 5: The daily milk production of Simmental cows is approximately normally distributed with a mean of 15 kg/day and a standard deviation of 7 kg/day. Assume that as a farmer, you have 150 Simmental cows.

- a) Calculate the probability that a day's production for a single animal will be less than 10 kg.
- b) How many of your cows can be expected to produce more than 10 kg in a given day?
- c) Calculate the probability that the total amount of milk produced in a day will be more than 2300 kg.
- d) What is the probability that the average daily milk amount per cow in a given day is more than 15 kg?
- e) Assume that you are the supplier for Pınar Süt Corporation. You have guaranteed that you will provide at least 2000 kg milk per day to Pınar. If you are short of that amount, you will be fined 1000 YTL. What is the expected value of your fine per day?