

**STATISTICS APPLIED TO BUSINESS
ADMINISTRATION. ACADEMIC YEAR 2013-2014
SEMINAR 4 (60 MINUTES)**

Date: _____

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EXERCISE 1 (4 POINTS)

In a given high school, in which there are 800 students registered, we wish to estimate, with an error of ± 0.02 and a 90% confidence level, the proportion of students that plan to participate in the summer camps program organized by the school.

1. **(1 Point)** Compute the minimum sample size that is required to estimate the aforementioned proportion if simple random sampling with replacement is used.
2. **(2 Points)** Repeat the previous item if simple random sampling without replacement is used.
3. **(1 Point)** Comment on the results obtained in the previous items.

EXERCISE 2 (6 POINTS)

In a given city, we wish to estimate the mean expense in fast food per family and year. It is believed that, with regard to this specific expense, there are two clearly different types of families: the ones with larger consumption, which are those families with some members younger than 20, and families with smaller consumption, which are those with no members younger than 20. The total number of families in the city is 200000, with 80000 families belonging to the first type of families and 120000 to the other type. It is also known that the dispersion is larger for families with larger consumption when compared to the second type of families. Based on the above, the selected method of sampling is stratified sampling of 5000 families.

1. **(1 Point)** If proportional allocation is used, what would the sample size for each stratum in the population under study be?
2. **(1 Point)** What would happen to the sample sizes for each stratum in the population previously obtained under proportional allocation if n-optimal allocation is used instead? Comment on your response.

3. **(2 Points)** If it is known that the expenses quasivariances for each one of the strata are 1500, for the first type of family, and 1000 for the second type, compute the sample sizes for each stratum if n-optimal allocation is used.
4. **(2 Points)** Compute the estimator's variance for the mean expense fast food per family and year for the aforementioned two types of allocation. Comment on your response.

Remark: This piece of paper should be handed in together with your solutions to the aforementioned exercises. You should also write, both on this piece of paper and in the solutions you provide, the names of the students in your group that have actively participated in this seminar activity.