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Bus 274: Further Statistics for Business

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PROBLEM SHEET # 1

Problem 1:
This problem is about estimating the parameters of a normal distribution.

a) Simulate

   i) $n = 100$

   ii) $n = 1000$

   realizations of a normally distributed random variable with $\mu = 10$ and $\sigma^2 = 5$.

b) Use your simulated data to estimate μ and σ^2.

c) What does it mean when we say: $\hat{\mu}$ and $\hat{\sigma}^2$ have a probability distribution? Explain, repeating your simulation several times.

Problem 2:
A study is made to determine the proportion of voters in a sizable community who favour the construction of a nuclear power plant. It turned out that 140 of 400 randomly selected voters favour the project.

a) Compute a point estimate for the share of voters who favour the project.

b) Does this point estimate equal the share of voters in the community who favour the project?

c) Compute an approximate 95% confidence interval for the share of voters in the community who favour the project.

d) Is it correct to say that this confidence interval contains the true share with probability 95%?

e) What has to be done if more accurate information about the share is desired, "more accurate" meaning: a confidence interval which is only half as long?