Engineering Mathematics and Statistics (B39AX)
Fall 2023

Tutorial 5

Problem A. Last year, a telephone company in Scotland undertook a survey of telephone usage. According to the media relations manager, the company randomly selected $n = 15000$ local telephone calls of residential customers in Glasgow. The mean duration of the sampled calls was $\overline{x} = 3.8$ minutes. Use this information to determine a 95% confidence interval for the true mean duration μ of all telephone calls made by residential customers in Glasgow. Assume each call has a standard deviation of $\sigma = 4.0$ minutes.

Problem B. A car manufacturer wants to find the average consumption of a new car, measured in km/L. From previous experience, he knows that the standard deviation is 3.0 km/L. How many trials does the manufacturer need to run to be able to state with 99% confidence that he knows the average to within 0.5 km/L?

Problem C. A manufacturer of car tyres needs to estimate the mean lifetime μ of a new line of steel-belted radials. From past experience, it is known that the population standard deviation of tyre lifetime is $\sigma = 2500$ miles, and that the tyre lifetime is normally distributed. The results from independent tests on a random sample of $n = 16$ tyres are displayed below.

40133	37494	39446	42294
39433	40403	41559	37176
38309	41224	35012	39322
40572	38544	40882	39704

Use the data to obtain a 90% confidence interval for the true mean life μ of this new line of steel-belted radial. Note that $\sum_{i=1}^{16} x_i = 631507$.