

Q1: The manager of a local savings branch wants to estimate the average amount held in passbook savings accounts by depositors at the bank. From past experience it is known that the savings amounts are normally distributed with a variance $\sigma^2 = 81$. A sample of 36 accounts were examined and the sample mean \bar{x} was computed to be €100.

(a) Obtain a 95% confidence interval for the true average savings.

[Answer: (97.06, 102.94)]

(b) If the total number of accounts is 5000, obtain a 95% confidence interval of the total saved at this bank.

Q2. A controller of a store wishes to estimate the average amount spent each month by individuals holding credit cards to within $\pm\text{€}6$ of the true amount.

Based on previous experience it is known that the standard deviation is €21.

Determine the sample size necessary to estimate the mean to within $\pm\text{€}6$ of the true value with (a) 95% confidence and (b) 99% confidence.

Q3. A random sample of size 121 taken from a normal distribution has a mean \bar{x} of 12.9 and a standard deviation $s = 3.2$. Calculate a 99% confidence interval for μ . If \bar{x} and s are the same (that is, 12.9 and 3.2) for a sample of size 9, what would the 99% confidence interval be?

Q4. A sample of 10 small debts from a small business were

16.39, 25.09, 16.31, 20.94, 17.58, 19.06, 17.21, 18.48, 16.88, 15.51

(a) If it can be assumed that the observations are normal, obtain a 95% confidence interval for the average debt of the business. [*Hint: use of t distribution*]

(b) What would the confidence interval be if it were known that the variance of the debts is 9? [*Hint: known variance so use of normal distribution*]

Q5. An auditor for a consumer agency would like to determine the proportions of claims that are paid by a health insurance company within two months of receipt of claim. A random sample of 200 claims was selected and it was found that 160 of these claims were paid within two months. Obtain a 99% confidence interval for the true proportion paid within two months.

Q6. The following data show the age in cars in years (x), and the second-hand price (y) of a sample of 11 cars advertised in a local paper:

Car	1	2	3	4	5	6	7	8	9	10	11
Age of car in years (x_i)	5	7	6	6	5	4	7	6	5	5	2
Price of car in €100 (y_i)	80	57	58	55	70	88	43	60	69	63	118

(a) Draw a scatter plot of the data and comment on whether a linear relationship between age and price seems plausible.

(b) Compute the regression line for these data and use your result to estimate the price of a 3 year old and of a 5½ year old car.

(c) Calculate the correlation coefficient and interpret what it says about the extent to which price depends on age. [Answer: -0.9570]