



QUESTION WORKBOOK

Confidence intervals and tests with the t-distribution

Further Statistics 2 · Year FM

6 questions · 26 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 State when the t-distribution is used in place of the normal, and how the two differ. [2]

A2 A random sample of 9 observations from a normal population has $\Sigma x = 216$ and $s = 4.5$. Write down the number of degrees of freedom, and find the standard error of the mean and the value of the test statistic for testing $H_0: \mu = 22$. [3]

SECTION B · Standard

B1 A random sample of 16 observations from a normal population has mean 52.5 and $s = 6$. Test at the 5% level, in one tail, whether the population mean exceeds 50. The critical value is 1.753. [5]

- B2** A random sample of 16 observations from a normal population has mean 52.5 and $s = 6$. Find a 95% confidence interval for the population mean, using the t value 2.131, and state whether the interval supports the claim that the mean is 50. [4]

- B3** Eight subjects are measured before and after a treatment. The differences, after minus before, are 2, 5, -1, 3, 4, 0, 2, 1. Test at the 5% level, in one tail, whether the treatment raises the measurement. The critical value is 1.895. [6]

SECTION C · Stretch

- C1** Two independent random samples are taken from normal populations. The first has $n = 6$, mean 18.2 and $s = 2.4$; the second has $n = 9$, mean 15.8 and $s = 3.1$. Assuming the two populations have equal variances, test at the 5% level, in two tails, whether the population means differ. The critical value is 2.160. [6]