



QUESTION WORKBOOK

Hypothesis testing: correlation and the normal

Statistics · Year 12–13

6 questions · 20 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** Observations are drawn from $N(\mu, \sigma^2)$. State the distribution of the mean of n independent observations. [2]

- A2** Masses are $N(\mu, 4^2)$ grams, and H_0 sets $\mu = 100$ against $H_1: \mu < 100$. A sample of 25 has mean 98.6. Find the z -value for the test. [3]

SECTION B · Standard

- B1** Complete the test above at the 5% significance level. [5]

- B2** Bags from a machine have masses $N(\mu, 4^2)$ grams, with $H_0: \mu = 30$ and $H_1: \mu > 30$. A sample of 16 bags has mean 31.2. Test at the 5% level. [4]

- B3** A sample of 20 paired observations gives a product moment correlation coefficient of $r = 0.62$. The critical value for a one-tailed 1% test at $n = 20$ is 0.5155. Carry out the test of $H_0: \rho = 0$ against $H_1: \rho > 0$. [3]

SECTION C · Stretch

- C1** Explain why increasing the sample size makes a fixed difference between the sample mean and the hypothesised mean more significant. [3]