



QUESTION WORKBOOK

The quality of tests

Further Statistics 1 · Year FM

6 questions · 20 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 Define a Type I error and a Type II error. [2]

A2 For $X \sim B(10, p)$ with $H_0: p = 0.5$, $H_1: p < 0.5$ and critical region $X \leq 1$, find the size of the test. [3]

SECTION B · Standard

B1 For the same test, find the probability of a Type II error when $p = 0.2$, and the power at that value. [4]

- B2** For the same test, find the power at $p = 0.1$ and comment on how it compares with the power at $p = 0.2$. [3]

- B3** A Poisson test has $H_0: \lambda = 5$ against $H_1: \lambda > 5$ with critical region $X \geq 10$. Find its size, and its power when $\lambda = 8$. [4]

SECTION C · Stretch

- C1** Explain why widening a critical region raises the power of a test but is not automatically an improvement. [4]