InkMaths

QUESTION WORKBOOK

The quality of tests

Further Statistics 1 · Year FM

6 questions · 20 marks

PRINT EDITION

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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: λ > 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]