



QUESTION WORKBOOK

Hypothesis testing with the binomial

Statistics · Year 12–13

6 questions · 20 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** Define the null hypothesis, the alternative hypothesis, and the significance level of a test. [2]

- A2** A die is suspected of being biased towards sixes. It is rolled 30 times. Write down suitable hypotheses in terms of p , and state the distribution of the number of sixes X under H_0 . [3]

SECTION B · Standard

- B1** A spinner is claimed to land on red with probability 0.3. In 25 spins it lands on red 12 times. Test, at the 5% level, whether the spinner favours red more than claimed. [5]

- B2** $X \sim B(20, 0.4)$ under H_0 , with $H_1: p > 0.4$. Find the critical region for a test at the 5% level, and the actual significance level. [4]

- B3** For the test above, state the conclusion if a count of 12 is observed, and explain why this differs from 'proving $p = 0.4$ '. [3]

SECTION C · Stretch

- C1** Explain why the test probability is $P(X \geq 12)$ rather than $P(X = 12)$. [3]