



QUESTION WORKBOOK

The binomial distribution

Statistics · Year 12–13

8 questions · 22 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** A fair twelve-sided die is rolled once and X is the score shown. Name the distribution of X , and state the probability it assigns to each value. [2]

- A2** State the conditions under which a count X can be modelled by a binomial distribution $B(n, p)$. [3]

- A3** $X \sim B(8, 0.25)$. Find $P(X = 2)$ to 3 significant figures. [2]

SECTION B · Standard

- B1** $X \sim B(12, 0.2)$. Find $P(X = 3)$ and $P(X = 0)$, each to 3 significant figures. [3]

B2 $X \sim B(20, 0.15)$. Write $P(X \geq 4)$ in a form a calculator's cumulative function accepts. [2]

B3 A machine produces faulty parts with probability 0.1, independently. In a box of 10 parts, find the probability of at most one faulty part, to 3 significant figures. [3]

B4 Twenty students in the same class are each asked whether they attended a party at the weekend, and X counts the yes answers. Give a reason why $B(20, p)$ may be a poor model. [2]

SECTION C · Stretch

C1 A spinner lands on red with probability 0.2 on each spin, independently. It is spun n times. Find the smallest value of n for which the probability of at least one red exceeds 0.99. [5]