



QUESTION WORKBOOK

Discrete random variables and expectation

Further Statistics 1 · Year FM

6 questions · 22 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 A discrete random variable X has $P(X = x) = kx$ for $x = 1, 2, 3, 4$. Find the value of k . [2]

A2 X takes the values 1, 2, 3, 4 with probabilities $1/6, 1/3, 1/3, 1/6$. Find $E(X)$. [3]

SECTION B · Standard

B1 The random variable X takes the values 1, 2, 3 and 4 with probabilities $1/6, 1/3, 1/3$ and $1/6$. Find $E(X^2)$ and hence $\text{Var}(X)$, as exact fractions. [4]

B2 The random variable X has $E(X) = 5/2$ and $\text{Var}(X) = 11/12$. Write down $E(3X - 1)$ and $\text{Var}(3X - 1)$. [3]

- B3** A game pays out £ X where X takes values 0, 1, 5 with probabilities 0.7, 0.2, 0.1. Find the expected payout, and state the largest fair stake. [4]

SECTION C · Stretch

- C1** The discrete random variable X takes the values 1, 2, 3 and 4. $P(X = 1) = P(X = 2) = a$ and $P(X = 3) = P(X = 4) = b$, and $E(X) = 2.7$. Find a and b , and hence find $\text{Var}(5 - 2X)$. [6]