



QUESTION WORKBOOK

Mean, variance and skewness of continuous variables

Further Statistics 2 · Year FM

7 questions · 28 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 $f(x) = x/8$ for $0 \leq x \leq 4$. Find $E(X)$ and $\text{Var}(X)$. [3]

A2 The continuous random variable X has $E(X) = 8/3$ and $\text{Var}(X) = 8/9$. Find $E(3X + 2)$ and $\text{Var}(3X + 2)$. [3]

SECTION B · Standard

B1 For $f(x) = x/8$ on $0 \leq x \leq 4$, find the median and the mode, and describe the skew with a justification. [4]

- B2** $f(x) = 3(1 - x)^2$ for $0 \leq x \leq 1$. Find the mean, the variance and the median, and name the skew. [6]

- B3** For $f(x) = x/8$ on $0 \leq x \leq 4$, find $E(1/X)$. [3]

- B4** Prove from the integral definitions that $\text{Var}(aX + b) = a^2\text{Var}(X)$ for a continuous random variable. [3]

SECTION C · Stretch

- C1** The continuous random variable X has $f(x) = x/8$ for $0 \leq x \leq 4$, with mean $8/3$ and variance $8/9$. Find the three quartiles, and hence find the quartile coefficient of skewness $(Q_3 - 2Q_2 + Q_1)/(Q_3 - Q_1)$. Compare it with the value of $3(\text{mean} - \text{median})/\sigma$ and comment. [6]