

CANDIDATE
NAME

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MATHEMATICS

9709/73

Paper 7 Probability & Statistics 2 **(S2)**

May/June 2017

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: List of Formulae (MF9)

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces at the top of this page.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer **all** the questions.

Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.

The use of an electronic calculator is expected, where appropriate.

You are reminded of the need for clear presentation in your answers.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is 50.

This document consists of **11** printed pages and **1** blank page.



2 In a random sample of 200 shareholders of a company, 103 said that they wanted a change in the management.

(i) Find an approximate 92% confidence interval for the proportion, p , of all shareholders who want a change in the management. [3]

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(ii) State the probability that a 92% confidence interval does not contain p . [1]

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4 Last year the mean level of a certain pollutant in a river was found to be 0.034 grams per millilitre. This year the levels of pollutant, X grams per millilitre, were measured at a random sample of 200 locations in the river. The results are summarised below.

$$n = 200 \quad \Sigma x = 6.7 \quad \Sigma x^2 = 0.2312$$

(i) Calculate unbiased estimates of the population mean and variance. [3]

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(ii) Test, at the 10% significance level, whether the mean level of pollutant has changed. [5]

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5 (i) A random variable X has the distribution $Po(42)$.

(a) Use an appropriate approximating distribution to find $P(X \geq 40)$. [4]

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(b) Justify your use of the approximating distribution. [1]

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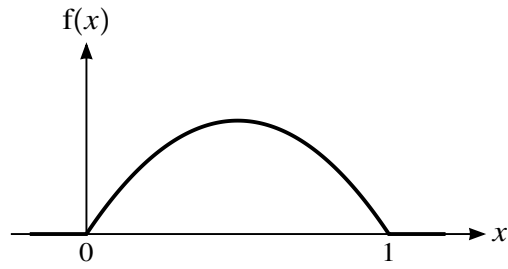
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6



The diagram shows the graph of the probability density function, f , of a continuous random variable X , where f is defined by

$$f(x) = \begin{cases} k(x - x^2) & 0 \leq x \leq 1, \\ 0 & \text{otherwise.} \end{cases}$$

- (i) Show that the value of the constant k is 6. [3]

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- (ii) State the value of $E(X)$ and find $\text{Var}(X)$. [4]

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