

CANDIDATE  
NAME

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**MATHEMATICS**

**9709/71**

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

**October/November 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.



- 1 A random variable,  $X$ , has the distribution  $Po(31)$ . Use the normal approximation to the Poisson distribution to find  $P(X > 40)$ . [3]

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- 2 An airline has found that, on average, 1 in 100 passengers do not arrive for each flight, and that this occurs randomly. For one particular flight the airline always sells 403 seats. The plane only has room for 400 passengers, so the flight is overbooked if the number of passengers who do not arrive is less than 3. Use a suitable approximation to find the probability that the flight is overbooked. [4]

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4 The lengths, in millimetres, of rods produced by a machine are normally distributed with mean  $\mu$  and standard deviation 0.9. A random sample of 75 rods produced by the machine has mean length 300.1 mm.

(i) Find a 99% confidence interval for  $\mu$ , giving your answer correct to 2 decimal places. [3]

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The manufacturer claims that the machine produces rods with mean length 300 mm.

(ii) Use the confidence interval found in part (i) to comment on this claim. [1]

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5 A continuous random variable,  $X$ , has probability density function given by

$$f(x) = \begin{cases} \frac{1}{4}(x+1) & 0 \leq x \leq 2, \\ 0 & \text{otherwise.} \end{cases}$$

(i) Find  $E(X)$ .

[3]

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(ii) Find the median of  $X$ .

[3]

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