

CANDIDATE  
NAME

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**MATHEMATICS**

**9709/72**

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) (i) A random variable  $X$  has the distribution  $B(2540, 0.001)$ . Use the Poisson approximation to the binomial distribution to find  $P(X > 1)$ . [3]

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- (ii) Explain why the Poisson approximation is appropriate in this case. [1]

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- (b) Two independent random variables,  $S$  and  $T$ , have distributions  $Po(2.1)$  and  $Po(3.5)$  respectively. Find the mean and standard deviation of  $S + T$ . [2]

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2 The number of words in History essays by students at a certain college has mean  $\mu$  and standard deviation 1420.

(i) The mean number of words in a random sample of 125 History essays was found to be 4820. Calculate a 98% confidence interval for  $\mu$ . [3]

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(ii) Another random sample of  $n$  History essays was taken. Using this sample, a 95% confidence interval for  $\mu$  was found to be 4700 to 4980, both correct to the nearest integer. Find the value of  $n$ . [3]

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**(ii)** Find the median of  $X$ . [3]

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- (ii) Each candidate's overall mark is  $M$  where  $M = X + 1.5Y$ . The minimum overall mark for grade A is 135. Find the proportion of students who gain a grade A. [5]

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