



### **Cambridge Assessment International Education**

Cambridge International Advanced Level

CANDIDATE NAME			
CENTRE NUMBER		CANDIDATE NUMBER	
MATHEMATICS			9709/73
Paper 7 Probabilit	ty & Statistics 2 (S2)	0	ctober/November 2019
			1 hour 15 minutes
Candidates answe	er on the Question Paper.		
Additional Material	ls: 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 in the space provided. If additional space is required, you should use the lined page at the end of this booklet. The question number(s) must be clearly shown.

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.

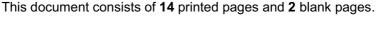
The use of an electronic calculator is expected, where appropriate.

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.





of Y.	lom variat	ole Y is th	ne sum of	four inde	ependent v	alues of $X$ .	Find the n	nean and va	ari
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The rand	lom variat	ole $Z$ is de	efined by	Z = 4X -	- 3. Find th	ne mean an	d variance	of $Z$ .	
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	Calculate the probability that fewer than 4 cars arrive in a 2-minute period.	
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(ii)	Use a suitable approximating distribution to calculate the probability that at least 14 in a 1-hour period.	40 cars

The times, in minutes, taken by competitors to complete a puzzle have mean  $\mu$  and standard deviation 3.

The times taken by a random sample of 10 competitors are noted and the results are given below.

		25.2	26.8	18.5	25.5	30.1	28.9	27.0	26.1	26.0	24.9	
<b>(i)</b>	Stati	ng a ne	cessary	assumpti	ion, calc	ulate a 9	97% con	fidence i	nterval 1	for μ.		[5]
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	Two more rendem complete each of 10 competitors, are taken. Their times are used to colculate
(ii)	Two more random samples, each of 10 competitors, are taken. Their times are used to calculate
(ii)	Two more random samples, each of 10 competitors, are taken. Their times are used to calculat two more 97% confidence intervals for $\mu$ . Find the probability that neither of these interval
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(ii)	The random variable Y has the distribution $Po(\lambda)$ , and $P(Y = 0) = P(Y = 2)$ . Find $\lambda$ .

(iii)	The	random variable Z has the distribution $Po(5.2)$ and it is given that $P(Z = n) < P(Z = n + n)$	1).
	(a)	Write down an inequality in $n$ .	[1]
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	<b>(b)</b>	Hence or otherwise find the largest possible value of $n$ .	[2]
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<b>6</b> A random variable <i>X</i> has probability density function given by	6	A random	variable $X$	has	probability	y density	y function	given	by
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$$f(x) = \begin{cases} k(3x - x^2) & 0 \le x \le 3, \\ 0 & \text{otherwise.} \end{cases}$$

(i)	Show that $k = \frac{2}{9}$ .	[3]
(ii)	Find $P(1 \le X \le 2)$ .	[2]
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Bob is a self-employed builder. In the past his weekly income had mean \$546 and standard deviation

Test at 1	the 2.5% sign	nificance leve	l whether B	ob's mean w	eekly income	has increased
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Bob finds his mean weekly income for another random sample of 40 weeks and carries out a similar test at the 2.5% significance level.

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# **Additional Page**

If you use the following lined page to complete the answer(s) to any question(s), the question number(s) must be clearly shown.

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