



Cambridge Assessment International Education

Cambridge International Advanced Level

NAME			
CENTRE NUMBER		CANDIDATE NUMBER	
MATHEMATICS			9709/72
Paper 7 Probability 8	Statistics 2 (S2)		May/June 2019
			1 hour 15 minutes
Candidates answer or	n 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 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.

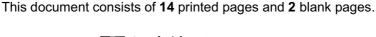
The use of an electronic calculator is expected, where appropriate.

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.





The random variable X has the distribution Po(5).

1

(i)	Find $P(X = 2)$.	[1]
(-)		[-]
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		•••••
		•••••
It is	given that $P(X = n) = P(X = n + 1)$.	
		F4.7
(ii)	Write down an equation in n .	[1]
		•••••
(iii)	Hence or otherwise find the value of n .	[1]
		•••••
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(i)	Describe fully the distribution of the mean of a random sample of 36 values of X .	
		••••••
		•••••
(ii)	The distribution in part (i) might be either exact or approximate. State a condition up the distribution is exact.	nder w
(ii)		
(ii)	the distribution is exact.	
(ii)	the distribution is exact.	
(ii)	the distribution is exact.	
(ii)	the distribution is exact.	
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(ii)	the distribution is exact.	

	n = 50	$\Sigma t = 92.5$	$\Sigma t^2 = 175.25$	
(i) Calculate unbiase	ed estimates of	the population	mean and variance.	

Test the claim at the 5% significance level.	

of these plants is at least 1.5 times the height		[
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5

5	on tl look	manufacturer of a certain type of biscuit claims that 10% of packets include a free offer printed he packet. Jyothi suspects that the true proportion is less than 10%. He plans to test the claim by ing at 40 randomly selected packets and, if the number which include the offer is less than 2, he reject the manufacturer's claim.
	(i)	State suitable hypotheses for the test. [1]
	(ii)	Find the probability of a Type I error. [3]

On another occasion Jyothi looks at 80 randomly selected packets and finds that exactly 6 include the free offer.

	Calculate an approximate 90% confidence interval for the proportion of packets that include t offer.	he [3]
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)	Use your confidence interval to comment on the manufacturer's claim.	[1]
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6	X is a	random	variable	with	probability	density	function	given	by

$$f(x) = \begin{cases} \frac{a}{x^2} & 1 \le x \le b, \\ 0 & \text{otherwise,} \end{cases}$$

where a and b are constants.

(1)	Show that $b = \frac{a}{a-1}$.	[3]
		••••••
		••••••
(ii)	Given that the median of X is $\frac{3}{2}$, find the values of a and b .	[3]

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(iii)	Use your values of a and b from part (ii) to find $E(X)$.	[3]
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7

All the seats on a certain daily flight are always sold. The number of passengers who have bought

(i)	Explain what the number 320 represents in this context.	
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(;;)	The total number of passengers who have bought seats but fail to arrive for	r this flight
(11)	2 randomly chosen days is denoted by X . Use a suitable approximating distribution $P(2 < X < 6)$.	
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(iii)	Justify the use of your approximating distribution.	
	3	
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After some changes, the airline wishes to test whether the mean number of passengers per day who fail to arrive for this flight has decreased.

2.3% SI	gnificance l	evei.							
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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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