

Cambridge International AS & A Level

CANDIDATE NAME					
CENTRE NUMBER			CANDIDATE NUMBER		

MATHEMATICS 9709/63

Paper 6 Probability & Statistics 2

May/June 2020

1 hour 15 minutes

You must answer on the question paper.

You will need: List of formulae (MF19)

INSTRUCTIONS

- Answer all questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do not use an erasable pen or correction fluid.
- Do not write on any bar codes.
- If additional space is needed, you should use the lined page at the end of this booklet; the question number or numbers must be clearly shown.
- You should use a calculator where appropriate.
- You must show all necessary working clearly; no marks will be given for unsupported answers from a calculator.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.

INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [].

This document has 16 pages. Blank pages are indicated.

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A random sample of 100 values of a variable X is taken. These values are summarised below.

1

	n = 100	$\Sigma x = 1556$	$\Sigma x^2 = 29004$	
Calculate unbiased es	stimates of the po	opulation mean a	and variance of X .	[3]

$Y \sim N(3860)$	·						
Find the pro	obability that, or	n a particula	r day, Y is	less than t	he total of	W and X .	
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The number of customers who visit a particular shop between 9.00 am and 10.00 am has the distribution

Use an increas		nating di	stributio	n to test	at the 2	5% sign	ificance 1	evel whet	her the	value of
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	Find $P(A_1 + A_2 < 2)$.	
(b)	Given that $A_1 + A_2 < 2$, find $P(A_1 = 1)$.	

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Give a reason why $A_1 - A_2$ cannot have a Poisson distribution.	[1]

(c)

a)	Calculate an approximate 99% confidence interval for <i>p</i> .	[4]
<i>u)</i>	Calculate an approximate 55% community at 101 p.	. • .
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b)	Sunita believes that the die is fair. Use your answer to part (a) to comment on her belief.	[1]
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F	Find the value of α .
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		$f(x) = \begin{cases} \frac{6}{125} (10 - x)(x) \\ 0 \end{cases}$	$(x-5)$ $5 \le x \le 10$, otherwise.	
(a)	State the value of E	E(X).		
(b)	Find Var(X).			

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	narket researcher is investigating the length of time that customers spend at an information d plans to choose a sample of 50 customers on a particular day.	
a)	He considers choosing the first 50 customers who visit the information desk.	
	Explain why this method is unsuitable.	[1
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o h visl	actual lengths of time, in minutes, that customers spend at the information desk may be assurated mean μ and variance 4.8. The researcher knows that in the past the value of μ was 6.0. hes to test, at the 2% significance level, whether this is still true. He chooses a random sample customers and notes how long they each spend at the information desk.	Н
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(Give a reason why it was necessary to use the Central Limit theorem in your answer to part (c)
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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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