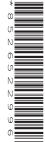


Cambridge International AS & A Level

CANDIDATE NAME				
CENTRE NUMBER		CANDIDATE NUMBER		



MATHEMATICS 9709/62

Paper 6 Probability & Statistics 2

February/March 2024

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. Any blank pages are indicated.

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The lengths, Xcm, of a sample of 100 insects of a certain type were summarised as follows.

1

	$n = 100$ $\sum x = 36.8$ $\sum x^2 = 17.34$	
(a)	Calculate unbiased estimates for the population mean and variance of <i>X</i> .	[3]
(b)	State a necessary condition for the estimates found in part (a) to be reliable.	[1]

	Calculate an approximate 98% confidence interval for the proportion of people living in Barape
	who own a BETEC phone. [3
)	Manjit claims that more than 40% of the people living in Barapet own a BETEC phone.
))	Manjit claims that more than 40% of the people living in Barapet own a BETEC phone. Use your answer to part (a) to comment on this claim.
))	
))	
)	
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))	

1)	Use a suitable approximating distribution to find the probability that at least 3 of the tickets sold by the agent are prize-winning tickets. [3]
)	Justify the use of your approximating distribution in this context. [1]

a)	Find the probability that in a randomly chosen year the firm uses more gasoline than diesel for

The costs per litre of gasoline and diesel fuel are \$0.80 and \$0.85 respectively.

Find the probabilities tween \$20 000 a	and \$22 000.	San San			<i>y</i>	[:
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						•••••

(0)	Find the much shillity that dyning a mandambash area 2 days and 4 mandambash 1.4	Г1 ⁷
(a)	Find the probability that during a randomly chosen 2-day period no girls arrive late.	[1]
		•••••
		•••••
		1
(b)	Find the probability that during a randomly chosen 5-day period the total number of students arrive late is less than 3.	who [3]
		•••••
		•••••
		•••••
c)	It is given that the values of $P(G = r)$ and $P(B = r)$ for $r \ge 3$ are very small and can be ignored	d.
	Find the probability that on a randomly chosen day more girls arrive late than boys.	[3]
		•••••
		•••••

Foll the	owing a timetable change the teacher claims that on average more students arrive late than before change. During a randomly chosen 5-day period a total of 4 students are late.
(d)	Test the teacher's claim at the 5% significance level. [5]

The graph of the probability density function f of a random variable X is symmetrical about the line

)	Using only this information show that $P(X > -1) = \frac{245}{256}$.	
	250	
		•••••
		•••••
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is 1	now given that, for x in a suitable domain,	
	$f(x) = k(12+4x-x^2)$, where k is a constant.	
)	Find the value of k .	
		•••••
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Find Var(<i>X</i>).							
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know that to ca	when that in 2004 the values of μ and σ were 163.21 and 6.95 respectively. The government claim the value of μ this year is greater than it was in 2004. In order to test this claim a researcher plan arry out a hypothesis test at the 1% significance level. He records the heights of a random sample of adult females in Litania this year and finds the value of the sample mean.								
(a)	State the probability of a Type I error.								
	should assume that the value of σ after 2004 remains at 6.95 . Given that the value of μ this year is actually 164.91, find the probability of a Type II error. [5]								

Additional page

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

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