

Cambridge International AS & A Level

CANDIDATE NAME					
CENTRE NUMBER			CANDIDATE NUMBER		

MATHEMATICS 9709/62

Paper 6 Probability & Statistics 2

May/June 2021

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 [].

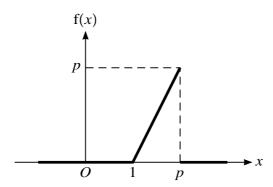
This document has **12** pages. Any blank pages are indicated.

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In a game, a ball is thrown and lands in one of 4 slots, labelled A, B, C and D. Raju wishes to test

(a)	State suitable null and alternative hypotheses for Raju's test.	[1]
		•••••
		•••••
The	ball is thrown 100 times and it lands in slot A 15 times.	
(b)	Use a suitable approximating distribution to carry out the test at the 2% significance level.	[5]
		•••••
		•••••
		•••••
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The	rand	om variable X has the distribution B(400, 0.01).
(a)	Find	Var(4X+2).
	•••••	
(b)	(i)	State an appropriate approximating distribution for X , giving the values of any parameters Justify your choice of approximating distribution. [2]
	(ii)	Use your approximating distribution to find $P(2 \le X \le 5)$. [2]



The random variable X takes values in the range $1 \le x \le p$, where p is a constant. The graph of the probability density function of X is shown in the diagram.

(a)	Show that $p = 2$.	[2]
		•••••
(b)	Find $E(X)$.	[5]
		•••••
		•••••

(_ \	Find the many and arrived a Calle to take the Calle Ca	F 2.7
(a)	Find the mean and variance of the total time for Wendy's journey.	[2]
		•••••
		•••••
lf W	lendy's journey takes more than 60 minutes, she is late for work.	
(b)	Find the probability that, on a randomly chosen day, Wendy will be late for work.	[3]
		•••••
		•••••
(c)	Find the probability that the mean of Wendy's journey times over 15 randomly chosen of be less than 54.5 minutes.	days will [3]

The time, in minutes, spent by customers at a particular gym has the distribution $N(\mu, 38.2)$. In the

a)	State what is meant by a Type I error in this context.	[1]
b)	The mean time for a sample of 20 customers is found to be 45.6 minutes.	
	Test at the 2.5% significance level whether the value of μ has changed.	[5]
		•••••
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The heights, h centimetres, of a random sample of 100 fully grown animals of a certain species were

1110 U	sured. The results			2	
		n = 100	$\Sigma h = 7570$	$\Sigma h^2 = 588050$	
(a)	Find unbiased es	timates of the J	population mear	n and variance.	[3]

(b)	Calculate a 99% confidence interval for the mean height of animals of this species.	[3]
	r random samples were taken and a 99% confidence interval for the population mean, μ , wan each sample.	s found
(c)	Find the probability that all four of these confidence intervals contain the true value of μ .	. [2]
		,
		•••••
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Customers arrive at a particular shop at random times. It has been found that the mean number of

α,	Find the probability that exactly 4 customers arrive during a 10-minute interval.	[2]
)	Find the probability that at least 4 customers arrive during a 20-minute interval.	[2]
		••••••

arrive during a 2-hour interv	al.		
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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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