

Cambridge International Examinations

Cambridge International Advanced Level

Additional Mater	ials:	List of Formulae (MF9)					
Candidates answ	ver on th	ne Question Paper.						
					1	hour 15	minut	es
Paper 7 Probab	ility & St	atistics 2 (S2)				May/Ju	ıne 20	17
MATHEMATICS						,	9709/	73
NUMBER [NUMBER				
CENTRE				CANDIDATE				
CANDIDATE NAME								

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.

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.





This document consists of 11 printed pages and 1 blank page.

1	A residents' association has 654 members, numbered from 1 to 654. The secretary wishes to send a
	questionnaire to a random sample of members. In order to choose the members for the sample she
	uses a table of random numbers. The first line in the table is as follows.

	1096	4357	3765	0431	0928	9264	
The numbers of the first three members in the sa		embers i	n the sa	mple are	109 and	1 643.	Find the numbers of the next
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2

In a random sample of 200 shareholders of a company, 103 said that they wanted a change in the

(i)	Find an approximate 92% confidence interval for the proportion, p , of all shareholders who was a change in the management.
ii)	State the probability that a 92% confidence interval does not contain p .

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locations in the river. The results are summarised below.

Last year the mean level of a certain pollutant in a river was found to be 0.034 grams per millilitre. This year the levels of pollutant, X grams per millilitre, were measured at a random sample of 200

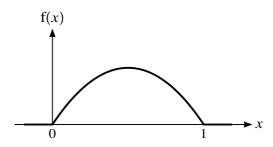
4

	n = 200	$\Sigma x = 6.7$	$\Sigma x^2 = 0.2312$	
i) Calculate unbiased	estimates of t	he population	mean and variance.	[
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i) Test, at the 10% sig	gnificance leve	el, whether the	mean level of pollutant has changed.	[.
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(a)	Use an appropriate approximating distribution to find $P(X \ge 40)$.	[4]
		••••••
(b)	Justify your use of the approximating distribution.	[1]

e an appropriate approximating distribution to find $P(Y > 2)$.	
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	tify your use of the approximating distribution.

6



The diagram shows the graph of the probability density function, f, of a continuous random variable X, where f is defined by

$$f(x) = \begin{cases} k(x - x^2) & 0 \le x \le 1, \\ 0 & \text{otherwise.} \end{cases}$$

(i)	Show that the value of the constant k is 6. [3]
(ii)	State the value of $E(X)$ and find $Var(X)$. [4]

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7

7	with at th num	the past the number of accidents per month on a certain road was modelled by a random variable distribution Po(0.47). After the introduction of speed restrictions, the government wished to test, the 5% significance level, whether the mean number of accidents had decreased. They noted the ber of accidents during the next 12 months. It is assumed that accidents occur randomly and that isson model is still appropriate.
	(i)	Given that the total number of accidents during the 12 months was 2, carry out the test. [6]

Explain what is meant by a Type II error in this context.	[
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given that the mean number of accidents per month is now in fact 0.05.	
Using another random sample of 12 months the same test is carried out again, with the significance level. Find the probability of a Type II error.	san [-
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	given that the mean number of accidents per month is now in fact 0.05. Using another random sample of 12 months the same test is carried out again, with the significance level. Find the probability of a Type II error.

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