1 hour 15 minutes



## Cambridge International AS & A Level

Paper 6 Probabilit	ty & Statistics 2		May/June 2020
MATHEMATICS	3		9709/62
CENTRE NUMBER		CANDIDATE NUMBER	
CANDIDATE NAME			

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. Blank pages are indicated.

1

Find the percent	age of bags that a	re rejected.			[4]
		•••••		•••••••••••	•••••
•••••		•••••	•••••	••••••	•••••
•••••	••••••	•••••	•••••	•••••	••••••
•••••					
•••••		•••••			•••••
•••••	••••••	•••••	•••••	•••••	••••••

 $@ \ UCLES \ 2020 \\$ 9709/62/M/J/20 2

A shop obtains apples from a certain farm. It has been found that 5% of apples from this farm are

	apples at random. If the number of Grade A apples is more than 3 they will control has increased.	meruue iilat iil
(a)	State suitable null and alternative hypotheses for the test.	[1
<b>(1.)</b>		ro
(b)	Find the probability of a Type I error.	[3
In fa	act 2 of the 25 apples were Grade A.	
(c)	Which of the errors, Type I or Type II, is possible? Justify your answer.	[2

3

In the data-entry department of a certain firm, it is known that 0.12% of data items are entered

(i)	State the distribution of $X$ , including the values of any parameters.	
(1)	state the distribution of A, merading the values of any parameters.	
		•••••
(ii)	State an appropriate approximating distribution for $X$ , including the value parameters.	es (
	Justify your choice of approximating distribution.	
		•••••
		•••••
		•••••
(iii)	Use your approximating distribution to find $P(X > 2)$ .	
		•••••
		•••••
		•••••

© UCLES 2020 9709/62/M/J/20

]	Another large random sample of $n$ data items is chosen. The probability that the sample contains no data items that are entered incorrectly is more than 0.1.
	Use an approximating distribution to find the largest possible value of $n$ . [3]

4 The score on one spin of a 5-sided spinner is denoted by the random variable *X* with probability distribution as shown in the table.

x	0	1	2	3	4
P(X = x)	0.1	0.2	0.4	0.2	0.1

(a)	Show that $Var(X) = 1.2$ .	[2]
The	e spinner is spun 200 times. The score on each spin is noted and the mean, $\overline{X}$ , of and.	f the 200 scores is
<b>(b)</b>	Given that $P(\overline{X} > a) = 0.1$ , find the value of $a$ .	[4]

© UCLES 2020 9709/62/M/J/20

( <b>c</b> )	Explain whether it was necessary to use the Central Limit theorem in your answer to part (b).  [1]
d)	Johann has another, similar, spinner. He suspects that it is biased so that the mean score is less than 2. He spins his spinner 200 times and finds that the mean of the 200 scores is 1.86.
	Given that the variance of the score on one spin of this spinner is also 1.2, test Johann's suspicion at the 5% significance level.

(i)	State the values that $X$ can take.	[1
It is	given that $P(X = 1) = 3 \times P(X = 0)$ .	
(ii)	Find $\lambda$ .	[1
		•••••
		•••••
		•••••
		•••••
(iii)	Find $P(4 \le X \le 6)$ .	
(iii)		
(iii)		[2
(iii)	Find $P(4 \le X \le 6)$ .	[2
(iii)	Find $P(4 \le X \le 6)$ .	[2
(iii)	Find $P(4 \le X \le 6)$ .	[2
(iii)	Find $P(4 \le X \le 6)$ .	[2
(iii)	Find $P(4 \le X \le 6)$ .	[2
(iii)	Find $P(4 \le X \le 6)$ .	[2
(iii)	Find $P(4 \le X \le 6)$ .	[2
(iii)	Find $P(4 \le X \le 6)$ .	[2

© UCLES 2020 9709/62/M/J/20

distribution, it is found that $P(Y < 46) = 0.0668$ , correct to 4 decimal places		<b>.</b>	
F	Find $\mu$ .		
•			
•			
•			
•		•••••	
•		•••••	
•		•••••	
•			
•			
•			
•			
•			
•			
•			
•			
•			
•			
•			
•			
•			
•			
•			

**6** A random variable *X* has probability density function given by

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

where k and a are positive constants.

(a)	Show that $k = \frac{a}{a-1}$ .	[3]
( <b>b</b> )	Find $E(X)$ in terms of $a$ .	[3]

© UCLES 2020

		•••••
(c)	Find the 60th percentile of $X$ in terms of $a$ .	[4]

## **Additional Page**

must be clearly shown.	estion number(s)
	••••••
	••••••

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.