Cambridge International AS & A Level

CANDIDATE NAME					
CENTRE NUMBER			CANDIDATE NUMBER		

MATHEMATICS 9709/52

Paper 5 Probability & Statistics 1

February/March 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.

1

a)	
a)	Find the probability that a score of 3 is obtained for the first time on the 8th spin. [1]
h)	Find the much shility that foreign than 6 anims are magnined to obtain a same of 2 for the first time.
U)	Find the probability that fewer than 6 spins are required to obtain a score of 3 for the first time. [2]

Georgie has a red scarf, a blue scarf and a yellow scarf. Each day she wears exactly one of these

2

	en she wears a yellow scarf, she wears a hat with probability 0.3.
(a)	Find the probability that on a randomly chosen day Georgie wears a hat.
(b)	Find the probability that on a randomly chosen day Georgie wears a yellow scarf given that sl does not wear a hat.

3

a)	Find the probability that a shopper chosen at random spends between 85 and 100 minutes in	n th
<i>u)</i>	shopping centre.	[3
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8%	$% = \frac{1}{2} \left(\frac{1}{2} \right)^{2}$ of shoppers spend more than t minutes in the shopping centre.	
	% of shoppers spend more than t minutes in the shopping centre. Find the value of t .	
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4

The random variable X takes the values 1, 2, 3, 4 only. The probability that X takes the value x is

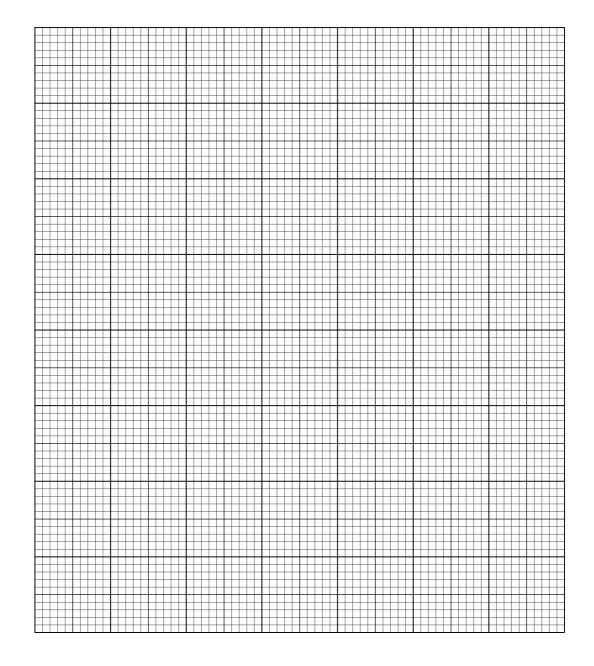
)	Draw up the probability distribution table for X , in terms of k .
	Show that $Var(X) = 1.05$.

5 A driver records the distance travelled in each of 150 journeys. These distances, correct to the nearest km, are summarised in the following table.

Distance (km)	0 – 4	5 – 10	11 – 20	21 – 30	31 – 40	41 – 60
Frequency	12	16	32	66	20	4

(a) Draw a cumulative frequency graph to illustrate the data.

[4]



(b)	For 30% of these journeys the distance travelled is $d \text{ km}$ or more.
	Use your graph to estimate the value of d . [2]
(c)	Calculate an estimate of the mean distance travelled for the 150 journeys. [3]

6	(a)	Find the total number of different arrangements of the 11 letters in the word CATERPILLAR. [2]
	(b)	Find the total number of different arrangements of the 11 letters in the word CATERPILLAR in which there is an R at the beginning and an R at the end, and the two As are not together. [4]

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7 There are 400 students at a school in a certain country. Each student was asked whether they preferred swimming, cycling or running and the results are given in the following table.

	Swimming	Cycling	Running
Female	104	50	66
Male	31	57	92

A student is chosen at random.

(a)	(i)	Find the probability that the student prefers swimming.	[1]
			••••
	(ii)	Determine whether the events 'the student is male' and 'the student prefers swimming' a independent, justifying your answer.	are [2]
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On average at all the schools in this country 30% of the students do not like any sports.

(b)	(i)	10 of the students from this country are chosen at random.	
		Find the probability that at least 3 of these students do not like any sports.	[3]
			••••••
	(ii)	90 students from this country are now chosen at random.	
	()	Use an approximation to find the probability that fewer than 32 of them do no	ot like anv
		sports.	57 like dify [5]
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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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