

Cambridge International AS & A Level

CANDIDATE
NAME

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CENTRE
NUMBER

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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 fair spinner with 5 sides numbered 1, 2, 3, 4, 5 is spun repeatedly. The score on each spin is the number on the side on which the spinner lands.

(a) Find the probability that a score of 3 is obtained for the first time on the 8th spin. [1]

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(b) Find the probability that fewer than 6 spins are required to obtain a score of 3 for the first time. [2]

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2 Georgie has a red scarf, a blue scarf and a yellow scarf. Each day she wears exactly one of these scarves. The probabilities for the three colours are 0.2, 0.45 and 0.35 respectively. When she wears a red scarf, she always wears a hat. When she wears a blue scarf, she wears a hat with probability 0.4. When 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. [2]

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(b) Find the probability that on a randomly chosen day Georgie wears a yellow scarf given that she does not wear a hat. [3]

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3 The time spent by shoppers in a large shopping centre has a normal distribution with mean 96 minutes and standard deviation 18 minutes.

(a) Find the probability that a shopper chosen at random spends between 85 and 100 minutes in the shopping centre. [3]

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88% of shoppers spend more than t minutes in the shopping centre.

(b) Find the value of t . [3]

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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 $kx(5 - x)$, where k is a constant.

(a) Draw up the probability distribution table for X , in terms of k . [2]

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(b) Show that $\text{Var}(X) = 1.05$. [4]

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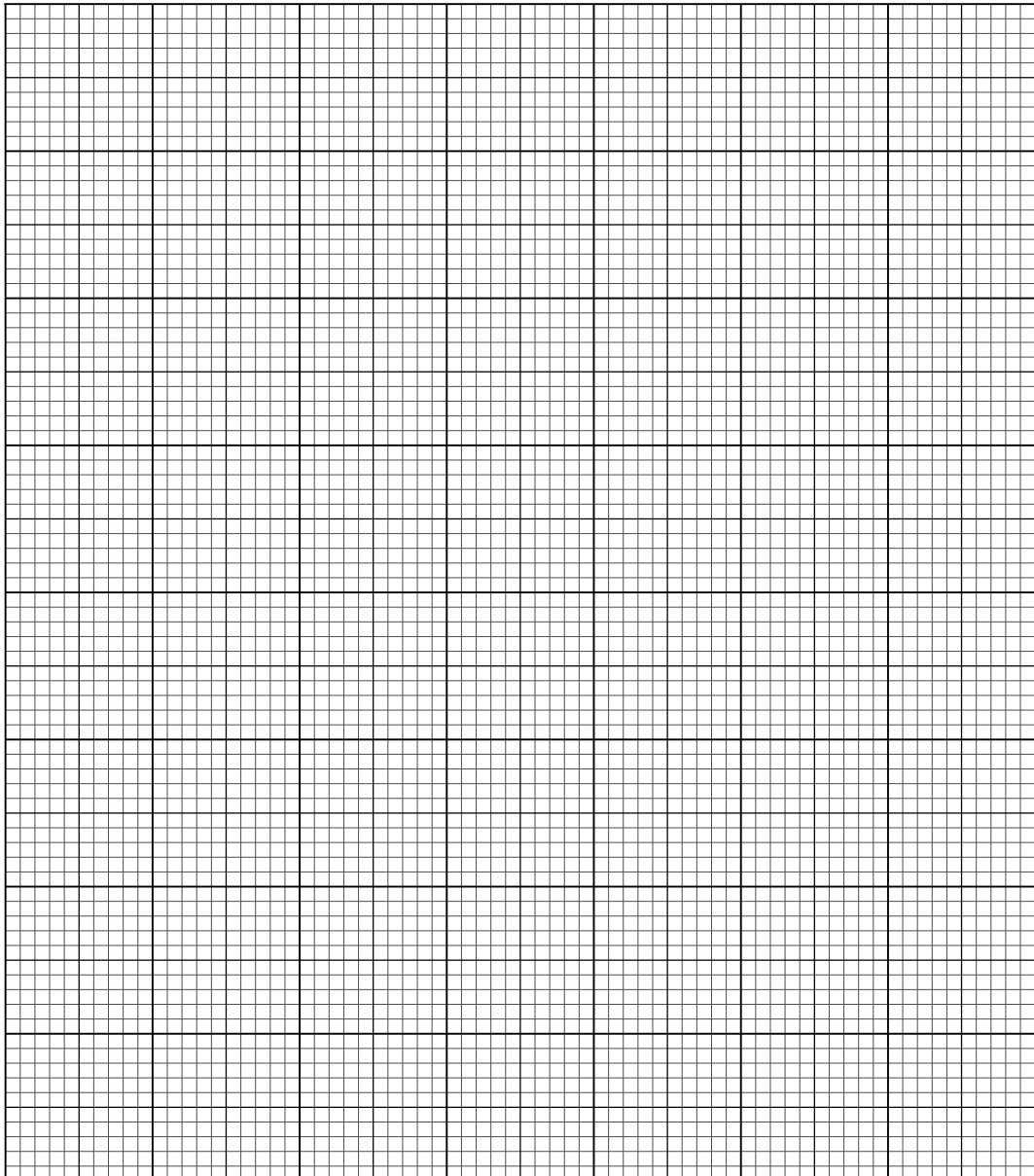
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- 5 A driver records the distance travelled in each of 150 journeys. These distances, correct to the nearest km, are summarised in the following table.

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]



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]

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(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 not like any sports. [5]

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