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Cambridge International AS & A Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

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MATHEMATICS **9709/51**

Paper 5 Probability & Statistics 1 **May/June 2026**

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. Do **not** use correction fluid or tape.
- 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 [ ].

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1 A fair red 4-sided spinner has sides numbered 1, 2, 3, 3.

A fair blue 4-sided spinner has sides numbered $-2, -1, -1, 1$.

The two spinners are spun and the numbers on the sides on which they land are noted. The random variable X is the sum of the two numbers obtained.

(a) Draw up the probability distribution table for X. [3]

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(b) Find Var(X). [3]

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2 At a certain college, each of the 150 students studies exactly one of Art, Business or Drama. The numbers of male and female students studying each of these subjects is given in the table.

	Art	**Business**	**Drama**
male	14	28	18
female	16	42	32

One student is selected at random.

A is the event that the student selected studies Art.

B is the event that the student selected studies Business.

M is the event that the student selected is male.

(a) Find $\mathrm{P}(A \cup B)$. [1]

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(b) Determine whether or not events B and M are independent. [2]

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(c) Find $\mathrm{P}(M \mid A)$. [1]

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(d) Find $\mathrm{P}(M' \cap B')$. [1]

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3 Aldeny and Farnlee are two ski resorts. The table shows the number of centimetres of snow that fell each week for the first 15 weeks of last year.

Aldeny	10	18	21	26	35	42	37	36	21	19	22	18	16	7	5
Farnlee	8	11	17	31	26	20	24	21	14	36	28	15	22	8	12

(a) Draw a back-to-back stem-and-leaf diagram to represent this information, with Aldeny on the left-hand side. [4]

(b) Find the median and the interquartile range of the number of centimetres of snow in Aldeny. [3]

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It is given that the lower quartile, median and upper quartile of the number of centimetres of snow in Farnlee are 12, 20 and 26 respectively.

(c) State **two** comparisons between the number of centimetres of snow in Aldeny and Farnlee. [2]

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4 Jong has a bag containing 5 red marbles and 7 blue marbles. He chooses marbles from the bag one at a time at random. Each time he replaces the marble in the bag.

(a) Find the probability that the first red marble that Jong obtains is before his 6th choice. [2]

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Kai has a bag containing 5 green marbles and 7 yellow marbles. He chooses marbles from the bag one at a time at random. Each time he replaces the marble in the bag.

(b) Find the probability that the second green marble that Kai obtains is on his 9th choice. [3]

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Lam has a bag containing 5 black marbles and 7 white marbles. He chooses 10 marbles from the bag one at a time, at random and with replacement.

(c) Find the probability that Lam obtains fewer than 3 black marbles. [3]

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5 Three letters are chosen at random from the 9 letters in the word RETRIEVES.

(a) Find the probability that at least one of the letters is an E. [4]

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(b) Find the number of different arrangements of the 9 letters in the word RETRIEVES in which there is an R at each end and the three Es are **not** all together. [3]

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(c) Find the number of different arrangements of the 9 letters in the word RETRIEVES in which there are exactly three letters between the two Rs. [3]

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6 The heights of adult Indian elephants are normally distributed with mean 2.74 m and standard deviation 0.25 m.

A random sample of 250 of these elephants is chosen.

(a) How many of these 250 elephants would you expect to have a height between 2.40 m and 3.10 m? [4]

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The heights of adult African elephants are normally distributed with mean μ m and standard deviation 0.28 m. It is known that 62% of adult African elephants have a height greater than 3.15 m.

(b) Find the value of μ. [3]

A random sample of 90 adult African elephants is chosen.

(c) Use an approximation to find the probability that more than 50 of these 90 elephants have a height greater than 3.15 m. [5]

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