



Cambridge International AS & A Level

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MATHEMATICS

9709/55

Paper 5 Probability & Statistics 1

May/June 2025

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 [].

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- 1 Two fair 6-sided dice with faces labelled 1, 2, 3, 4, 5, 6 are thrown. The two scores are noted. The random variable X is defined as follows.

- If the two scores are equal, $X = 0$
- If the scores are not equal, X is the larger score minus the smaller score

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

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- (b) Find $E(X)$ and $\text{Var}(X)$. [3]

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- 2 The heights of trees in a certain forest are classified as tall, medium or small. The heights can be modelled by a normal distribution with mean 20m and standard deviation 5m. Trees with a height of less than 14m are classified as small.
- (a) For 150 randomly chosen trees from this forest, how many would you expect to be classified as small? [4]

This image shows a full page of white paper with horizontal dashed lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Trees from this forest are classified as tall if their height is at least h m. 25% of the trees are classified as tall.

- (b) Find the value of h . [3]

This image shows a full page of white paper with horizontal dashed lines, typical of primary school writing paper. The lines are evenly spaced and run across the entire width of the page. There are no margins, text, or other markings present.



- 3 In a certain large school, on average, two pupils in five have music lessons.

A random sample of 80 pupils from this school is chosen.

- (a) Use an approximation to find the probability that fewer than 27 pupils have music lessons. [5]

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A random sample of 10 pupils from this school is now chosen.

- (b) Find the probability that no more than 2 pupils have music lessons. [3]

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- 4 Students applying to Drydale College take an entrance test. A student is either accepted or rejected or required to take another test with probabilities 0.3, 0.2 and 0.5 respectively. When a student takes a second test the outcomes and probabilities are exactly the same as for the first test. A student who has to take a third test is accepted with probability 0.25 and rejected with probability 0.75.

(a) Draw a tree diagram to illustrate this information, showing all the probabilities. [2]

(b) Find the probability that a randomly chosen student who applies to Drydale College is accepted. [2]

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- (c) Find the probability that a randomly chosen student who applies to Drydale College takes at least two tests given that the student is accepted. [3]

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Three friends apply to Drydale College.

- (d) Find the probability that all three are rejected. [2]

[illegible]

- 5 The Smarts and the Teasers are two quiz teams that each contain 11 members. Both complete a puzzle and the following table gives the times taken, in minutes, by the members of each team.

Smarts	38	30	13	29	18	22	28	18	11	9	41
Teasers	39	37	18	36	25	25	32	21	15	12	39

- (a) Represent this information in a back-to-back stem-and-leaf diagram with Smarts on the left-hand side. [4]

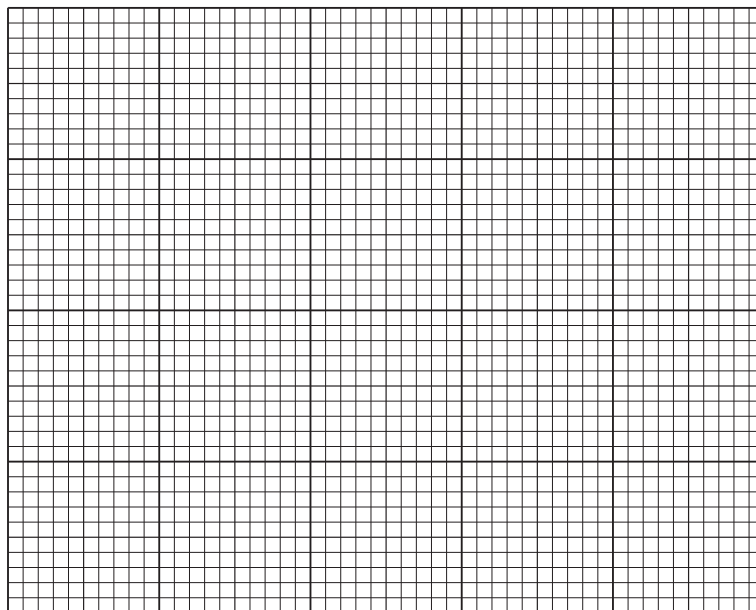




For the Teasers, the values of the lower quartile, median and upper quartile are 18, 25 and 37 minutes respectively.

- (b) On a single diagram draw box-and-whisker plots for the two teams.

[4]



- (c) Make two comparisons between the times for the two teams.

[2]

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- 6 A darts club has 12 members made up of 7 men and 5 women.

Every Monday, a team of 4 is chosen at random to represent the club in a competition.

- (a) Find the probability that, on a particular Monday, the team consists of 1 man and 3 women. [3]

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Every Tuesday, the darts club chooses 3 teams of 4. Each team enters a competition in a different town.

- (b) In how many different ways can the teams be chosen if there are no restrictions? [2]

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- (c) In how many different ways can the teams be chosen if each team must contain at least 1 man and at least 1 woman? [3]

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The 7 men stand in a line for a photograph. Two of them are brothers, George and Harry.

- (d) How many different arrangements are there of the 7 men in which there are exactly 2 men between George and Harry? [2]

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[illegible]

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