



Cambridge International AS & A Level

CANDIDATE
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MATHEMATICS

9709/62

Paper 6 Probability & Statistics 2

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 (a)** One of a group of three students is to be chosen at random.

Explain how a single throw of a fair six-sided dice could be used to make the choice. [1]

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The times, in minutes, taken by students to complete a test are normally distributed with mean 125 and variance 50. Two students are chosen at random.

- (b)** Find the probability that the difference between the times taken by these two students to complete the test is more than 12 minutes. [5]

[illegible]



- 2 The height of a certain species of plant is denoted by H cm. The heights of a random sample of 100 plants were measured, and the following results were found.
- The mean, $\bar{h}$, for the sample was 80.2.
 - An unbiased estimate of the population variance of H was 15.6.

Calculate the value of Σh^2 . [3]

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3 The random variable X has the distribution $\text{Po}(15)$.

(a) Write down an expression in terms of e for $P(X = 12)$. [1]

It is given that $P(X = n) = P(X = n + 1)$.

(b) Write down an equation in n , and hence find the value of n . [3]

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- 4 A biased spinner has four sides. Each side is of a different colour: yellow, red, green or black. The probability, p , that the spinner will land on red is unknown. The spinner was spun 200 times, and the proportion, a , of times that it landed on red was noted. This proportion was used to calculate an approximate 90% confidence interval for p . The width of this confidence interval was 0.1066 correct to 4 significant figures.

Find the two possible values of a .

[4]

[illegible]



6 Use suitable approximating distributions to answer the following.

(a) The random variable W has the distribution $B(700, 0.005)$.

(i) Find $P(W \geq 4)$.

[3]

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Two values of W are chosen at random.

(ii) Find the probability that the sum of these two values is less than 3.

[3]

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(b) The random variable X has the distribution $\text{Po}(200)$.

Use a suitable approximating distribution to find $P(X > 205)$.

[4]

[illegible]



- 7 The random variable X has probability density function given by

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

where k and a are positive constants.

- (a) Show that $k = \frac{3}{a}$. [3]

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It is given that $E(X) = 1$.

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

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(c) Find the median of X .

[3]

[illegible]



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Later, Birgitte carries out a similar test at the 5% significance level, using another 30 throws of the dice.

- (b) Calculate the probability of a Type I error. [2]

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- (c) Given that the value of p is actually 0.02, calculate the probability of a Type II error. [3]

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[illegible]

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