



Cambridge International AS & A Level

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FURTHER MATHEMATICS

9231/43

Paper 4 Further Probability & Statistics

May/June 2025

1 hour 30 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.



- Use the data to carry out a goodness of fit test at the 5% significance level to test the scientist's claim. [6]

[illegible]



5

The random variable Y is defined by $Y = \sqrt[3]{X}$.

- (c) Find the probability density function of Y . [5]

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(b) State an assumption necessary for the test in part (a) to be valid.

[1]





- 6 A bag contains 7 red balls and 3 blue balls. Kieran selects 2 balls at random, without replacement. The number of red balls selected by Kieran is denoted by X , and the number of different colours present in Kieran's selection is denoted by Y .

(a) Find the probability generating functions, $G_X(t)$ of X and $G_Y(t)$ of Y . [4]

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The random variable Z is the sum of the number of red balls and the number of different colours present in Kieran's selection. Kieran claims that the probability generating function of Z is equal to $G_X(t) \times G_Y(t)$.

(b) Explain why Kieran is incorrect. [1]

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- (c) Find the probability generating function of Z , expressing your answer as a polynomial in t . [4]

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- (d) Use the probability generating function of Z to find $E(Z)$. [2]

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