



Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

A-level FURTHER MATHEMATICS

Paper 3 Statistics

Friday 13 June 2025

Afternoon

Time allowed: 2 hours

Materials

- You must have the AQA Formulae and statistical tables booklet for A-level Mathematics and A-level Further Mathematics.
- You should have a graphical or scientific calculator that meets the requirements of the specification.
- You must ensure you have the other optional Question Paper/Answer Book for which you are entered (**either** Discrete **or** Mechanics). You will have 2 hours to complete **both** papers.

Instructions

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer each question in the space provided for that question. If you require extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do **not** write outside the box around each page or on blank pages.
- Show all necessary working; otherwise marks for method may be lost.
- Do all rough work in this book. Cross through any work that you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 50.

Advice

- Unless stated otherwise, you may quote formulae, without proof, from the booklet.
- You do not necessarily need to use all the space provided.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
TOTAL	



J U N 2 5 7 3 6 7 3 S 0 1

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Answer **all** questions in the spaces provided.

- 1** The continuous random variable X has standard deviation 16

Find $\text{Var}(5X - 12)$

Circle your answer.

[1 mark]

80

400

6388

6400

- 2** The discrete random variable Y has probability distribution

y	-6	2	3	18
$P(Y = y)$	0.56	0.02	0.21	0.21

Find the mode of Y

Circle your answer.

[1 mark]

-6

0.21

0.56

18



3 Cosmo is carrying out a hypothesis test.

He rejects the null hypothesis.

State which of the following statements is correct.

Tick (✓) **one** box.

[1 mark]

He could have made a Type I error but not a Type II error.

☐

He could have made a Type II error but not a Type I error.

☐

He could have made both a Type I error and a Type II error.

☐

He has made neither a Type I nor a Type II error.

☐

Turn over for the next question

Turn over ►



- 4** The continuous random variable X has cumulative distribution function

$$F(x) = \begin{cases} 0 & x < 0 \\ \sin 3x & 0 \leq x \leq \frac{\pi}{6} \\ 1 & x > \frac{\pi}{6} \end{cases}$$

- 4 (a)** Find $P(0.1 < X < 0.3)$

Give your answer to three decimal places.

[2 marks]

- 4 (b)** Show that the median of X is equal to $\frac{\pi}{18}$

[2 marks]



4 (c) Find $f(x)$, the probability density function of X

[2 marks]

Turn over for the next question

Turn over ►



- 5** The discrete random variable D has a discrete uniform distribution taking values $1, 2, 3, \dots, n$
- The continuous random variable R has a rectangular distribution taking values between n and $n + 1$
- The random variables D and R are independent.

5 (a) Show that $\text{Var}(D + R) = \frac{n^2}{12}$

[3 marks]



5 (b) It is given that $E(D + R) = \frac{n^2 + 44}{12}$

Show that $n = 16$

[3 marks]

Turn over for the next question

Turn over ►



A random sample of 11 students from the university is taken and their satisfaction scores are recorded. The summarised results are

[5 marks]

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6 (b) The university claims that the mean satisfaction score is 90

Test the university's claim, using the 10% level of significance.

[3 marks]

Turn over for the next question

Turn over ►



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This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

For the new edition, the company now decides that it wants

- the points scored changed so that they are all multiples of 10
- the mean score to be at least 50 times the mean score of the original game.

State how your answer to part (a) can be refined.

[1 mark]

Turn over ►



A random sample of 300 villagers is asked to state their favourite coffee shop and their favourite restaurant.

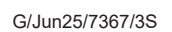
88 villagers said that their favourite coffee shop is B and their favourite restaurant is C

Test Elaine's claim, using the 5% level of significance.

[illegible]

[illegible]

Turn over ►



The company sends text messages at a constant mean rate and sends them individually.

[6 marks]

[illegible]

- 9 (b)** Show that the probability that the company sends more than 130 text messages in an hour is 0.169, correct to three decimal places.

[2 marks]

- 9 (c)** The company sends out text messages during a 7-hour interval on working days.

Find the probability that the company sends more than 130 text messages in an hour in exactly 2 of the 7 hours.

Give your answer to two decimal places.

[3 marks]

END OF QUESTIONS



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[illegible]

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