



Surname _____

Forename(s) _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

I declare this is my own work.

AS

FURTHER MATHEMATICS

Paper 2 Statistics

7366/2S

Friday 17 May 2024 Afternoon

Time allowed: 1 hour 30 minutes

At the top of the page, write your surname and forename(s), your centre number, your candidate number and add your signature.

[Turn over]



J U N 2 4 7 3 6 6 2 S 0 1

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 1 hour 30 minutes to complete BOTH papers.**

INSTRUCTIONS

- **Use black ink or black ball-point pen. Pencil should only be used for drawing.**
- **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 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 40.**

ADVICE

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

DO NOT TURN OVER UNTIL TOLD TO DO SO



Answer ALL questions in the spaces provided.

- 1** **The discrete random variable X has probability distribution function**

$$P(X = x) = \begin{cases} 0.45 & x = 1 \\ 0.25 & x = 2 \\ 0.25 & x = 3 \\ 0.05 & x = 4 \\ 0 & \text{otherwise} \end{cases}$$

State the mode of X

Circle your answer. [1 mark]

0.25 0.45 1 2.5



BLANK PAGE

[Turn over]



2

A test for association is to be carried out.

The tables below show the observed frequencies and the expected frequencies that are to be used for the test.

| OBSERVED | X | Y | Z |
|-----------------|-----------|-----------|-----------|
| A | 28 | 6 | 66 |
| B | 8 | 8 | 4 |
| C | 54 | 16 | 10 |

| EXPECTED | X | Y | Z |
|-----------------|-----------|-----------|-----------|
| A | 45 | 15 | 40 |
| B | 9 | 3 | 8 |
| C | 36 | 12 | 32 |



7

It is necessary to merge some rows or columns before the test can be carried out.

Find the entry in the tables that provides evidence for this.

Circle your answer. [1 mark]

Observed A–Z

Observed B–Z

Expected A–X

Expected B–Y

[Turn over]



3 The random variable X has a normal distribution with known variance 15.7

A random sample of size 120 is taken from X

The sample mean is 68.2

Find a 94% confidence interval for the population mean of X

Give your limits to three significant figures. [3 marks]



4 The discrete random variable Y has probability distribution

| | | | | |
|------------|------|------|------|------|
| y | 15 | 21 | 36 | 43 |
| $P(Y = y)$ | 0.16 | 0.32 | 0.29 | 0.23 |

The standard deviation of Y is s

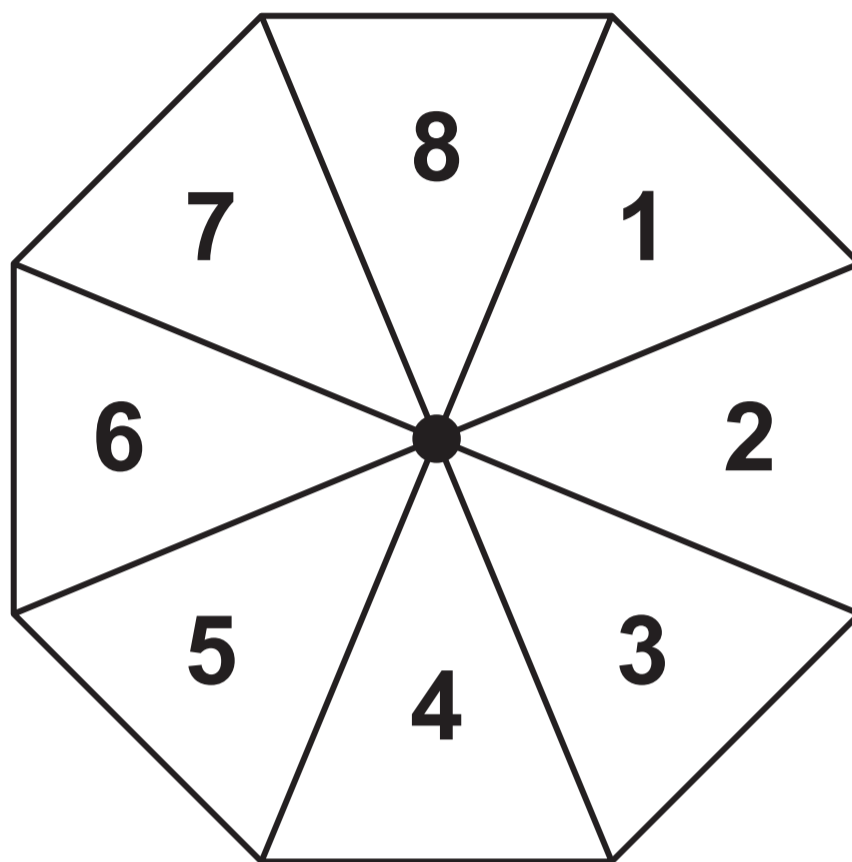
4 (a) Show that $s = 10.53$ correct to two decimal places. [4 marks]



[Turn over]



- 5** A spinner has 8 equal areas numbered 1 to 8, as shown in the diagram below.



The spinner is spun and lands with one of its edges on the ground.

- 5 (a)** Assume that the spinner lands on each number with equal probability.

5 (a) (i) State a distribution that could be used to model the number that the spinner lands on. [1 mark]

5 (a) (ii) Use your distribution from part 5 (a) (i) to find the probability that the spinner lands on a number greater than 5 [1 mark]

[Turn over]



5 (b) Clare spins the spinner 1000 times and records the results in the following table.

| | | | | |
|-------------------------|-----------|-----------|------------|------------|
| NUMBER LANDED ON | 1 | 2 | 3 | 4 |
| FREQUENCY | 37 | 64 | 112 | 161 |

| | | | | |
|-------------------------|------------|------------|------------|-----------|
| NUMBER LANDED ON | 5 | 6 | 7 | 8 |
| FREQUENCY | 308 | 156 | 109 | 53 |



5 (b) (ii) Describe how Clare's results could be used to adjust the model. [2 marks]

BLANK PAGE

[Turn over]



6 The continuous random variable X has probability density function

$$f(x) = \begin{cases} \frac{3x}{44} + \frac{1}{22} & 1 \leq x \leq 5 \\ 0 & \text{otherwise} \end{cases}$$

6 (a) Find $P(X > 2)$ [2 marks]



6 (c) Find $\text{Var}(44X^{-3})$

Give your answer to three decimal places. [5 marks]



[Turn over]



7 Over a period of time, it has been shown that the mean number of customers entering a small store is 6 per hour.

The store runs a promotion, selling many products at lower prices.



7 (a) Luke randomly selects an hour during the promotion and counts 11 customers entering the store.

He claims that the promotion has changed the mean number of customers per hour entering the store.

**Investigate Luke's claim, using the 5% level of significance.
[6 marks]**

[Turn over]



[Turn over]



7 (b) Luke randomly selects another hour and carries out the same investigation as in part (a).

Find the probability of a Type I error, giving your answer to four decimal places.

**Fully justify your answer.
[4 marks]**

[Turn over]



7 (c) When observing the store, Luke notices that some customers enter the store together as a group.

Explain why the model used in parts (a) and (b) might not be valid. [1 mark]

END OF QUESTIONS



BLANK PAGE

| For Examiner's Use | |
|--------------------|------|
| Question | Mark |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| TOTAL | |

Copyright information

For confidentiality purposes, all acknowledgements of third-party copyright material are published in a separate booklet. This booklet is published after each live examination series and is available for free download from www.aqa.org.uk.

Permission to reproduce all copyright material has been applied for. In some cases, efforts to contact copyright-holders may have been unsuccessful and AQA will be happy to rectify any omissions of acknowledgements. If you have any queries please contact the Copyright Team.

Copyright © 2024 AQA and its licensors. All rights reserved.

G/LM/Jun24/7366/2S/G4001/V3



3 6



2 4 6 A 7 3 6 6 / 2 S