



# Cambridge International AS & A Level

CANDIDATE  
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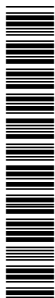
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**MATHEMATICS**

**9709/62**

Paper 6 Probability & Statistics 2

**October/November 2022**

**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 [ ].

This document has **16** pages. Any blank pages are indicated.

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- 1 Each of a random sample of 80 adults gave an estimate,  $h$  metres, of the height of a particular building. The results were summarised as follows.

$$n = 80 \quad \Sigma h = 2048 \quad \Sigma h^2 = 52760$$

- (a) Calculate unbiased estimates of the population mean and variance. [3]

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- (b) Using this sample, the upper boundary of an  $\alpha\%$  confidence interval for the population mean is 26.0.

Find the value of  $\alpha$ . [4]

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Exactly 3 faults are found in the randomly selected  $30\text{ m}^2$  of cloth.

- (c) Carry out the test at the 5% significance level. [2]

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Later a similar test was carried out at the 5% significance level, using another randomly selected  $30\text{ m}^2$  of cloth.

- (d) Given that the number of faults actually has a Poisson distribution with mean 0.5 per  $10\text{ m}^2$ , find the probability of a Type II error. [2]

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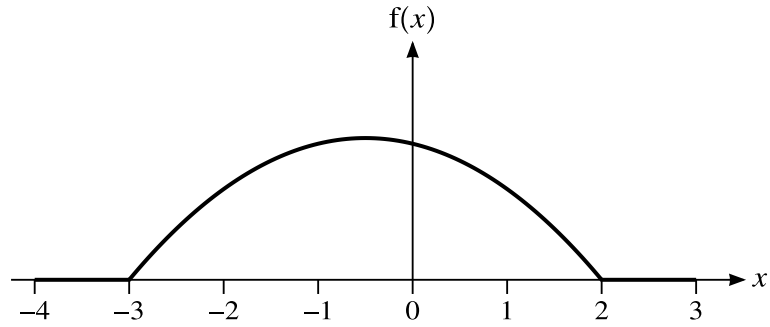












The diagram shows the graph of the probability density function,  $f$ , of a random variable  $X$  which takes values between  $-3$  and  $2$  only.

- (a) Given that the graph is symmetrical about the line  $x = -0.5$  and that  $P(X < 0) = p$ , find  $P(-1 < X < 0)$  in terms of  $p$ . [2]

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- (b) It is now given that the probability density function shown in the diagram is given by

$$f(x) = \begin{cases} a - b(x^2 + x) & -3 \leq x \leq 2, \\ 0 & \text{otherwise,} \end{cases}$$

where  $a$  and  $b$  are positive constants.

- (i) Show that  $30a - 55b = 6$ . [3]

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