

## SMIYL GCEALevelMaths9709

CANDIDATE  
NAME

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CENTRE  
NUMBER

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CANDIDATE  
NUMBER

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### MATHEMATICS

Paper 6 Guess Paper

9709 Stats 2

October/November 2024

1 hour and 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 11 pages.

1. The number of customer support calls that a company receives during an 7-hour working day is modelled by the random variable  $X$  with distribution  $\text{Po}(32.2)$ .

(a) State **two** assumptions that are required for the Poisson model to be valid in this context. [2]

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(b) i. Find the probability that the number of customer support calls received in a randomly chosen 2-hour period is between 4 and 6 inclusive. [3]

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ii. Find the probability that, in two randomly chosen 1-hour periods, exactly 1 customer support call will be received in one of the 1-hour periods, and at least 2 customer support calls will be received in the other 1-hour period. [4]

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- Use a suitable approximating distribution to find the probability that, in a randomly chosen 48-hour period, there will be too many customer support calls for the company to take. [4]

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2. The length in minutes, of chemistry lectures at a certain college has mean  $\mu$  and standard deviation 9.2.

(a) The total length of a random sample of 73 lectures was 4088 minutes.

Calculate a 99% confidence interval for  $\mu$ .

[3]

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The length, in minutes, of English lectures at the college has mean  $m$  and standard deviation  $s$ .

- (b) Using a random sample of 100 English lectures, a 99% confidence interval for  $m$  was found to have width 4.2 minutes.

Find the value of  $s$ .

[2]

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- (a) Find the probability that in a randomly chosen month the company sells more orange juice than lemonade. [5]

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4. (a) A random sample of 10 chocolate cakes from a certain baker was taken. Each cake was weighed and the masses in grams were as follows.

1200 900 1500 1300 800 1000 1700 1400 700 1600

Find unbiased estimates of the population mean and variance.

[3]

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ii. Explain briefly whether this statement is true or not. [1]

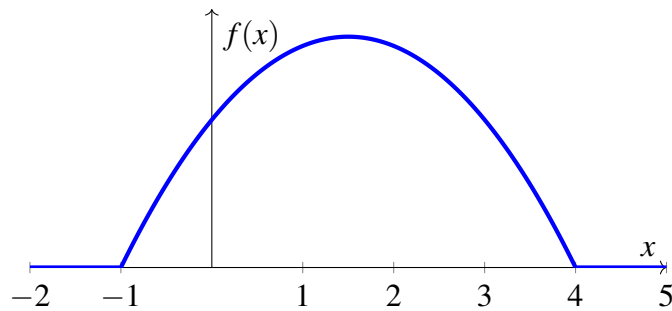
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- Given that the total number of visits is 6, carry out the test at the 2.5% significance level. [5]

6.



The diagram shows the graph of the probability density function,  $f$ , of a random variable  $X$  which takes the values between  $-1$  and  $4$  only.

- (a) Given that the graph is symmetrical about the line  $x = 1.5$  and that  $P(X < 2) = p$ , find  $P(1 < X < 2)$  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

$$f(x) = \begin{cases} a - b(x^2 - 3x) & -1 \leq x \leq 4, \\ 0 & \text{otherwise} \end{cases}$$

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

- i. Show that  $30a + 5b = 6$ . [3]

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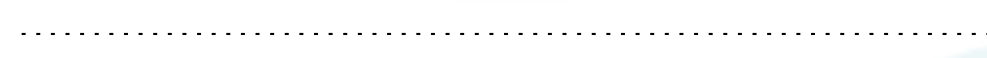
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