

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Pearson Edexcel
International
Advanced Level

Centre Number

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Candidate Number

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Wednesday 6 November 2019

Morning (Time: 1 hour 30 minutes)

Paper Reference **WMA12/01**

Mathematics

International Advanced Subsidiary/Advanced Level
Pure Mathematics P2

You must have:

Mathematical Formulae and Statistical Tables (Lilac), calculator

Total Marks

Candidates may use any calculator permitted by Pearson regulations. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Inexact answers should be given to three significant figures unless otherwise stated.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- There are 10 questions in this question paper. The total mark for this paper is 75.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.
- If you change your mind about an answer, cross it out and put your new answer and any working underneath.

Turn over ►

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Pearson

(a) Find, using calculus, the x coordinates of the stationary points of C .

(4)

(2)

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Question 1 continued

Lined area for writing the answer to Question 1.

(Total 6 marks)

Q1



- (b) Find, according to these models, the total amount of money that would be given to local charity by the adult population of the town from 2019 to 2032 inclusive. Give your answer to the nearest £1 000

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Question 2 continued

Handwriting practice area with 30 horizontal lines.

(Total 6 marks)

Q2



- $$\left(1 + \frac{x}{4}\right)^{12}$$

(3)

- $$\left(\frac{x^2 + 8}{x^5}\right)\left(1 + \frac{x}{4}\right)^{12}$$

(3)

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Question 3 continued

Lined area for writing the answer to Question 3.

(Total 6 marks)

Q3



4. $f(x) = (x - 3)(3x^2 + x + a) - 35$ where a is a constant

(a) State the remainder when $f(x)$ is divided by $(x - 3)$. (1)

Given $(3x - 2)$ is a factor of $f(x)$,

(b) show that $a = -17$ (2)

(c) Using algebra and showing each step of your working, fully factorise $f(x)$. (5)

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Question 4 continued

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Question 4 continued

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Question 4 continued

Lined area for writing the answer to Question 4.

(Total 8 marks)

Q4



5. (a) Given $0 < a < 1$, sketch the curve with equation

$$y = a^x$$

showing the coordinates of the point at which the curve crosses the y -axis.

(2)

x	2	2.5	3	3.5	4
y	4.25	6.427	9.125	12.34	16.06

The table above shows corresponding values of x and y for $y = x^2 + \left(\frac{1}{2}\right)^x$

The values of y are given to 4 significant figures as appropriate.

Using the trapezium rule with all the values of y in the given table,

- (b) obtain an estimate for $\int_2^4 \left(x^2 + \left(\frac{1}{2}\right)^x \right) dx$

(3)

Using your answer to part (b) and making your method clear, estimate

- (c) $\int_2^4 \left(x(x-3) + \left(\frac{1}{2}\right)^x \right) dx$

(2)

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Question 5 continued

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Question 5 continued

Lined area for writing the answer to Question 5.

(Total 7 marks)

Q5



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Question 6 continued

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Question 6 continued

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Question 6 continued

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(Total 7 marks)

Q6



7. Given $\log_a b = k$, find, in simplest form in terms of k ,

$$(i) \log_a \left(\frac{\sqrt{a}}{b} \right) \quad (2)$$

$$(ii) \frac{\log_a a^2 b}{\log_a b^3} \quad (2)$$

$$(iii) \sum_{n=1}^{50} (k + \log_a b^n) \quad (3)$$

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Question 7 continued

Lined area for writing the answer to Question 7.

(Total 7 marks)

Q7



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Question 8 continued

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Question 8 continued

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Question 8 continued

Lined area for writing the answer to Question 8.

(Total 9 marks)

Q8



Question 9 continued

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Question 9 continued

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(Total 12 marks)

Q9



$$y = ax^3 - 3x^2 + 3x + b$$

Given that

- the point $(2, 5)$ lies on C
- the gradient of the curve at $(2, 5)$ is 7

(4)

(3)

Question 10 continued

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Q10

END

TOTAL FOR PAPER IS 75 MARKS