

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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Tuesday 13 October 2020

Morning (Time: 1 hour 30 minutes)

Paper Reference **WMA14/01**

Mathematics

International Advanced Subsidiary/Advanced Level
Pure Mathematics P4

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 9 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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1. Given that n is an integer, use algebra, to prove by contradiction, that if n^3 is even then n is even.

(4)

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Question 1 continued

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(Total 4 marks)

Q1

Marking box for Q1



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Question 2 continued

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Question 2 continued

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(Total 8 marks)

Q2



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Question 3 continued

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(Total 6 marks)

Q3



4.

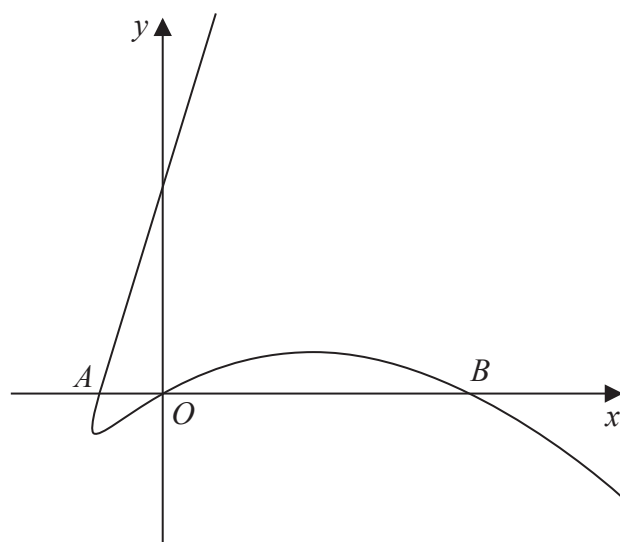


Figure 2

Figure 2 shows a sketch of part of the curve with parametric equations

$$x = 2t^2 - 6t, \quad y = t^3 - 4t, \quad t \in \mathbb{R}$$

The curve cuts the x -axis at the origin and at the points A and B , as shown in Figure 2.

- (a) Find the coordinates of A and show that B has coordinates $(20, 0)$. (3)

- (b) Show that the equation of the tangent to the curve at B is

$$7y + 4x - 80 = 0 \quad (5)$$

The tangent to the curve at B cuts the curve again at the point P .

- (c) Find, using algebra, the x coordinate of P . (4)

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Question 4 continued

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Question 4 continued

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(Total 12 marks)

Q4



A Cartesian coordinate system with a horizontal x-axis and a vertical y-axis. The origin is labeled O . A curve representing the function $y = \frac{1}{x}$ for $x > 0$ is shown. The region R is shaded in gray and is bounded by the x-axis, the vertical lines $x = 2$ and $x = 4$, and the curve $y = \frac{1}{x}$. The label R is placed within the shaded area.

(a) Find $\int \frac{\ln x}{x^2} dx$ (3)

$$y = \frac{3 + 2x + \ln x}{x^2} \quad x > 0.5$$

(b) Use the answer to part (a) to find the exact area of R , writing your answer in simplest form. (4)

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Question 5 continued

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Question 5 continued

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Question 5 continued

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(Total 7 marks)

Q5



$$y = x^{\sin x} \quad x > 0 \quad y > 0$$

- $$\tan x + x \ln x = 0 \quad (2)$$

Question 6 continued

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Question 6 continued

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Q6





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Question 7 continued

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Question 7 continued

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Question 7 continued

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(Total 12 marks)

Q7



- $$l_2: \quad \mathbf{r} = \begin{pmatrix} 2 \\ 0 \\ -9 \end{pmatrix} + \mu \begin{pmatrix} 2 \\ -1 \\ -3 \end{pmatrix} \quad \text{where } \mu \text{ is a scalar parameter}$$

(5)

(5)

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Question 8 continued

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Question 8 continued

Lined area for writing the answer to Question 8.

(Total 10 marks)

Q8



- $$\frac{dA}{dt} = \frac{A^{\frac{3}{2}}}{5t^2} \quad t > 0$$

$$A = \left(\frac{pt}{qt + r} \right)^2$$

(2)

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Question 9 continued

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Q9

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TOTAL FOR PAPER IS 75 MARKS