

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 18 June 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

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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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2. A circle C has equation

$$x^2 + y^2 + 4x - 10y - 21 = 0$$

Find

- (a) (i) the coordinates of the centre of C ,
 - (ii) the exact value of the radius of C .
- (3)

The point $P(5, 4)$ lies on C .

- (b) Find the equation of the tangent to C at P , writing your answer in the form $y = mx + c$, where m and c are constants to be found.
- (4)

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Question 2 continued

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(Total 7 marks)

Q2



- 5. A company makes a particular type of watch.

The annual profit made by the company from sales of these watches is modelled by the equation

$$P = 12x - x^{\frac{3}{2}} - 120$$

where P is the annual profit measured in thousands of pounds and $\text{£}x$ is the selling price of the watch.

According to this model,

- (a) find, using calculus, the maximum possible annual profit. (6)
- (b) Justify, also using calculus, that the profit you have found is a maximum. (2)

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Question 6 continued

Lined writing area for question 6



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Question 6 continued

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8. (i) Find the exact solution of the equation

$$8^{2x+1} = 6$$

giving your answer in the form $a + b \log_2 3$, where a and b are constants to be found.

(4)

(ii) Using the laws of logarithms, solve

$$\log_5(7 - 2y) = 2 \log_5(y + 1) - 1$$

(5)

Lined area for student answers.

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9. (a) Show that the equation

$$\cos \theta - 1 = 4 \sin \theta \tan \theta$$

can be written in the form

$$5 \cos^2 \theta - \cos \theta - 4 = 0 \quad (4)$$

(b) Hence solve, for $0 \leq x < \frac{\pi}{2}$

$$\cos 2x - 1 = 4 \sin 2x \tan 2x$$

giving your answers, where appropriate, to 2 decimal places. (4)

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Question 9 continued

Lined writing area for the answer to Question 9.

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Q9

(Total 8 marks)



10.

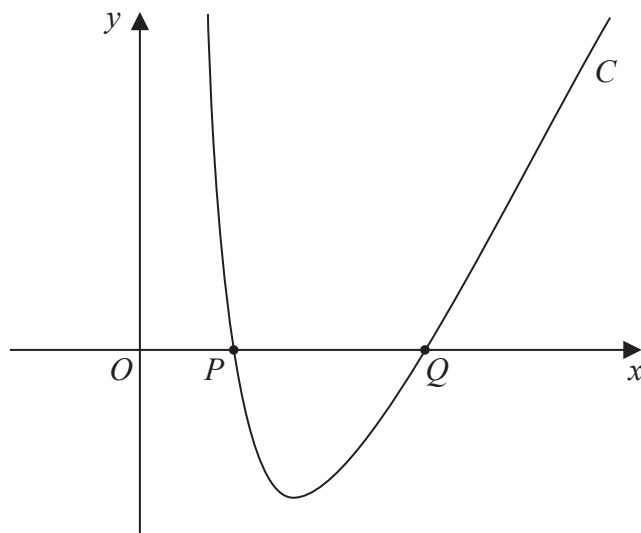


Figure 1

Figure 1 shows a sketch of part of the curve C with equation $y = f(x)$ where

$$f(x) = \frac{36}{x^2} + 2x - 13 \quad x > 0$$

Using calculus,

- (a) find the range of values of x for which $f(x)$ is increasing, (4)

- (b) show that $\int_2^9 \left(\frac{36}{x^2} + 2x - 13 \right) dx = 0$ (4)

The point $P(2, 0)$ and the point $Q(6, 0)$ lie on C .

Given $\int_2^6 \left(\frac{36}{x^2} + 2x - 13 \right) dx = -8$

- (c) (i) state the value of $\int_6^9 \left(\frac{36}{x^2} + 2x - 13 \right) dx$
- (ii) find the value of the constant k such that $\int_2^6 \left(\frac{36}{x^2} + 2x + k \right) dx = 0$ (3)

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Question 10 continued

Handwriting practice lines for Question 10.

Q10

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(Total 11 marks)

TOTAL FOR PAPER IS 75 MARKS

END

