

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

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Pearson Edexcel International Advanced Level

Wednesday 9 October 2024

Morning (Time: 1 hour 30 minutes)

Paper
reference

WMA11/01

Mathematics

**International Advanced Subsidiary/Advanced Level
Pure Mathematics P1**

You must have:

Mathematical Formulae and Statistical Tables (Yellow), 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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4.

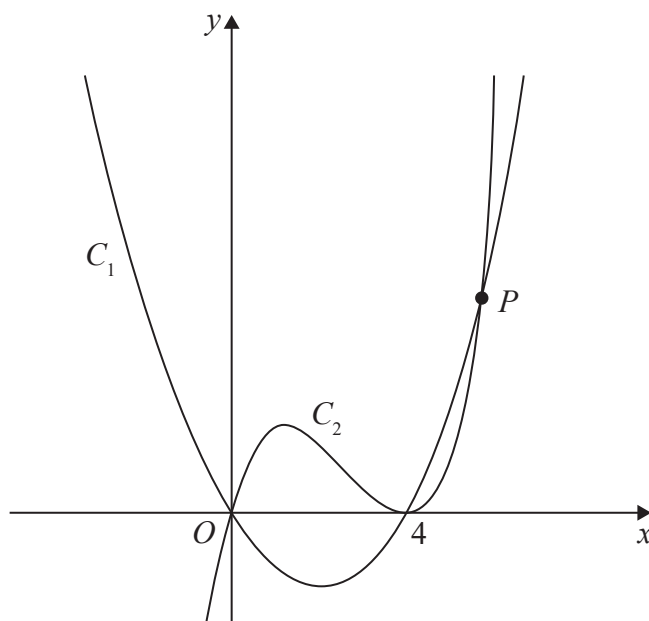


Figure 1

Figure 1 shows a sketch of part of the curves C_1 and C_2

Given that C_1

- has equation $y = f(x)$ where $f(x)$ is a quadratic function
- cuts the x -axis at the origin and at $x = 4$
- has a minimum turning point at $(2, -4.8)$

(a) find $f(x)$

(3)

Given that C_2

- has equation $y = g(x)$ where $g(x)$ is a cubic function
- cuts the x -axis at the origin and meets the x -axis at $x = 4$
- passes through the point $(6, 7.2)$

(b) find $g(x)$

(3)

The curves C_1 and C_2 meet in the first quadrant at the point P , shown in Figure 1.

(c) Use algebra to find the coordinates of P .

(4)



6. In this question you must show all stages of your working.

Solutions relying on calculator technology are not acceptable.

(a) Sketch the curve C with equation

$$y = \frac{1}{2-x} \quad x \neq 2$$

State on your sketch

- the equation of the vertical asymptote
- the coordinates of the intersection of C with the y -axis

(3)

The straight line l has equation $y = kx - 4$, where k is a constant.

Given that l cuts C at least once,

(b) (i) show that

$$k^2 - 5k + 4 \geq 0$$

(ii) find the range of possible values for k .

(6)



7.

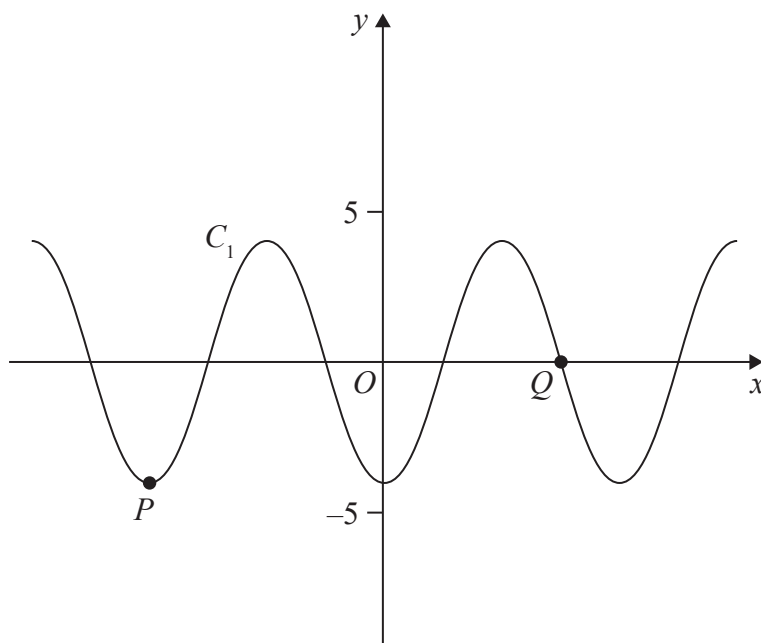


Figure 3

Figure 3 shows a plot of part of the curve C_1 with equation

$$y = -4 \cos x$$

where x is measured in radians.

Points P and Q lie on the curve and are shown in Figure 3.

(a) State

- (i) the coordinates of P
- (ii) the coordinates of Q

(3)

The curve C_2 has equation $y = -4 \cos x + k$ where x is measured in radians and k is a constant.

Given that C_2 has a maximum y value of 11

(b) (i) state the value of k

- (ii) state the coordinates of the minimum point on C_2 with the smallest positive x coordinate.

(3)

On the opposite page there is a copy of Figure 3 labelled Diagram 1.

(c) Using Diagram 1, state the number of solutions of the equation

$$-4 \cos x = 5 - \frac{10}{\pi} x$$

giving a reason for your answer.

(2)



Question 7 continued

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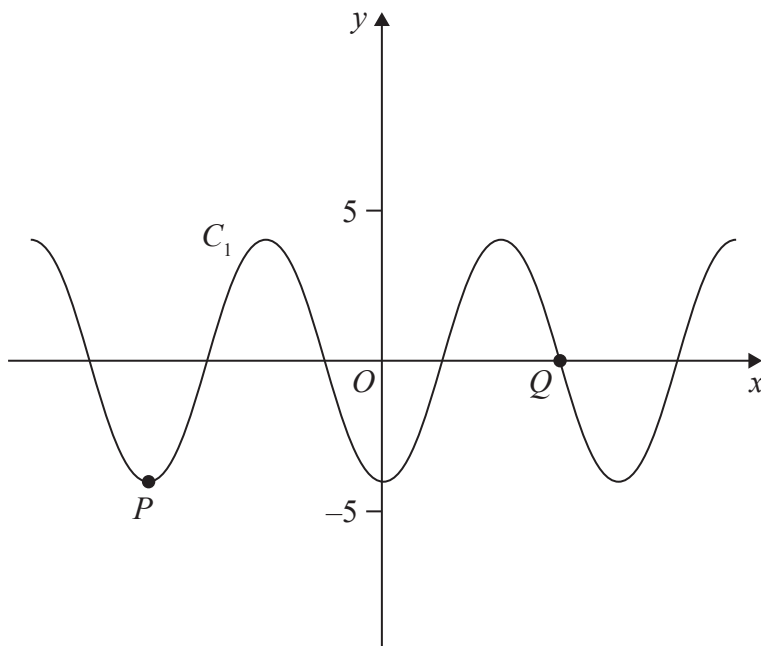


Diagram 1

(Total for Question 7 is 8 marks)



9.

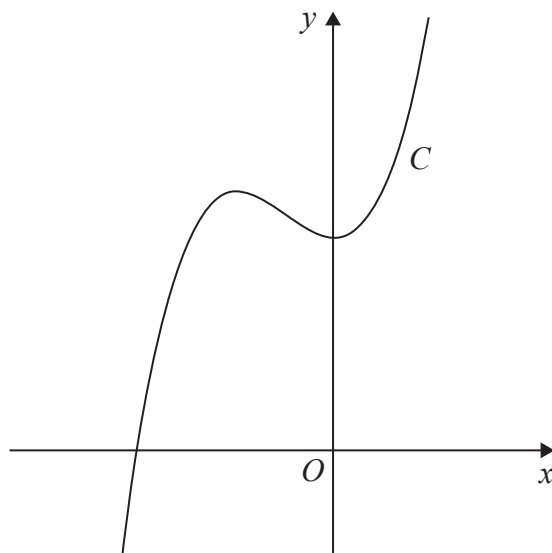


Figure 4

Figure 4 shows a sketch of the curve C with equation $y = f(x)$, where

$$f(x) = (x + 5)(3x^2 - 4x + 20)$$

(a) Deduce the range of values of x for which $f(x) \geq 0$ (1)

(b) Find $f'(x)$ giving your answer in simplest form. (3)

The point $R(-4, 84)$ lies on C .

Given that the tangent to C at the point P is parallel to the tangent to C at the point R

(c) find the x coordinate of P . (4)

(d) Find the point to which R is transformed when the curve with equation $y = f(x)$ is transformed to the curve with equation,

(i) $y = f(x - 3)$

(ii) $y = 4f(x)$ (2)



