

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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Monday 11 January 2021

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 (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. A curve has equation

$$y = 2x^3 - 5x^2 - \frac{3}{2x} + 7 \quad x > 0$$

- (a) Find, in simplest form, $\frac{dy}{dx}$ (3)

The point P lies on the curve and has x coordinate $\frac{1}{2}$

- (b) Find an equation of the normal to the curve at P , writing your answer in the form $ax + by + c = 0$, where a , b and c are integers to be found. (5)

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Question 1 continued

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(Total 8 marks)

Q1

Mark box for Q1



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- (2)

Question 2 continued

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Question 2 continued

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Question 2 continued

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(Total 6 marks)

Q2



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Question 3 continued

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(Total 5 marks)

Q3



Question 4 continued

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Question 4 continued

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(Total 8 marks)

Q4



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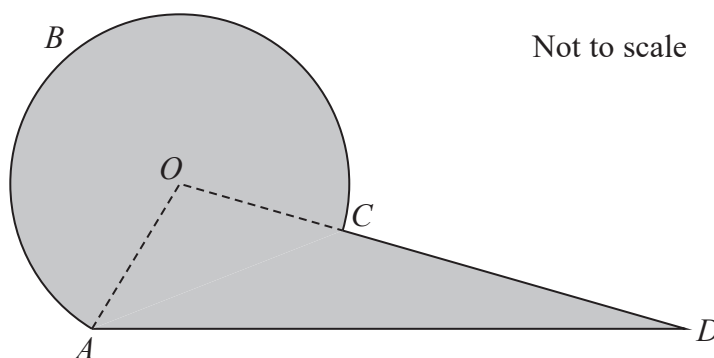


Figure 3

- (a) the size of angle AOD , in radians, to 3 decimal places, (3)
- (b) the length of arc ABC , in metres, to one decimal place, (2)
- (c) the total area of the viewing platform, in m^2 , to one decimal place. (4)

Question 5 continued

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Question 5 continued

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Question 5 continued

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(Total 9 marks)

Q5

Mark box for Q5



6. (a) Sketch the curve with equation

$$y = -\frac{k}{x} \quad k > 0 \quad x \neq 0 \quad (2)$$

- (b) On a separate diagram, sketch the curve with equation

$$y = -\frac{k}{x} + k \quad k > 0 \quad x \neq 0$$

stating the coordinates of the point of intersection with the x -axis and, in terms of k , the equation of the horizontal asymptote.

(3)

- (c) Find the range of possible values of k for which the curve with equation

$$y = -\frac{k}{x} + k \quad k > 0 \quad x \neq 0$$

does not touch or intersect the line with equation $y = 3x + 4$

(5)

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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 10 marks)

Q6



7. **In this question you must show all stages of your working.**
Solutions relying on calculator technology are not acceptable.

$$f(x) = 2x - 3\sqrt{x} - 5 \quad x > 0$$

- (a) Solve the equation

$$f(x) = 9 \quad (4)$$

- (b) Solve the equation

$$f''(x) = 6 \quad (5)$$

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Question 7 continued

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Question 7 continued

Lined area for writing the answer to Question 7.

(Total 9 marks)

Q7



8.

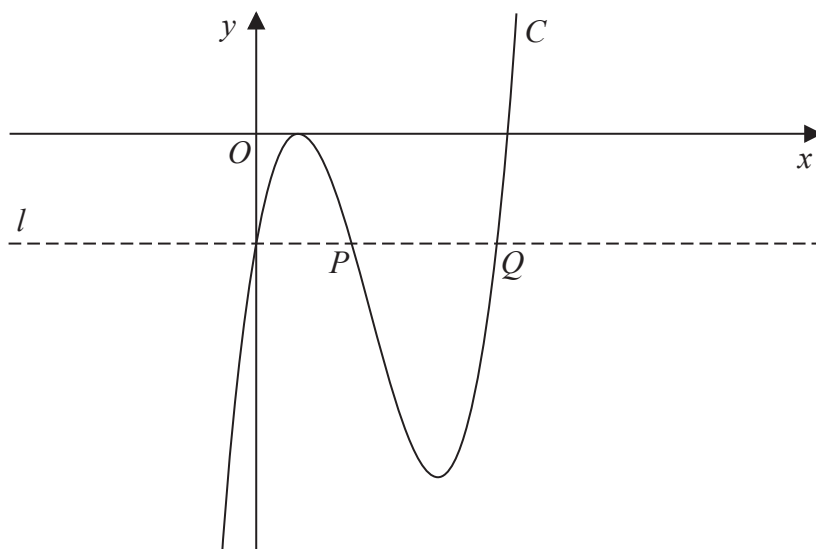


Figure 4

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

$$f(x) = (3x - 2)^2 (x - 4)$$

- (a) Deduce the values of x for which $f(x) > 0$ (1)

- (b) Expand $f(x)$ to the form

$$ax^3 + bx^2 + cx + d$$

where a , b , c and d are integers to be found. (3)

The line l , also shown in Figure 4, passes through the y intercept of C and is parallel to the x -axis.

The line l cuts C again at points P and Q , also shown in Figure 4.

- (c) Using algebra and showing your working, find the length of line PQ . Write your answer in the form $k\sqrt{3}$, where k is a constant to be found.

(Solutions relying entirely on calculator technology are not acceptable.) (5)

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Question 8 continued

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Q8





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Question 9 continued

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Question 9 continued

Handwriting practice area with 30 horizontal lines.

Q9

(Total 11 marks)

TOTAL FOR PAPER IS 75 MARKS

END

