

Write your name here

Surname

Other names

Pearson Edexcel
International
Advanced Level

Centre Number

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Candidate Number

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Core Mathematics C12

Advanced Subsidiary

Tuesday 13 January 2015 – Morning
Time: 2 hours 30 minutes

Paper Reference

WMA01/01

You must have:

Mathematical Formulae and Statistical Tables (Blue)

Total Marks

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. 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). Coloured pencils and highlighter pens must not be used.
- **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.
- When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information

- The total mark for this paper is 125.
- 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.

Turn over ►

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PEARSON



(Total 3 marks)



2.

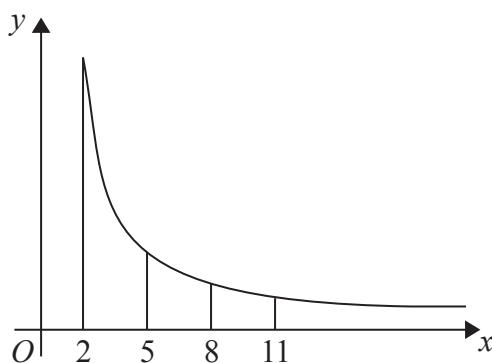


Figure 1

Figure 1 shows a sketch of part of the graph of $y = \frac{12}{\sqrt{(x^2 - 2)}}$, $x \geq 2$

The table below gives values of y rounded to 3 decimal places.

x	2	5	8	11
y	8.485	2.502	1.524	1.100

- (a) Use the trapezium rule with all the values of y from the table to find an approximate value, to 2 decimal places, for

$$\int_2^{11} \frac{12}{\sqrt{(x^2 - 2)}} dx \quad (4)$$

- (b) Use your answer to part (a) to estimate a value for

$$\int_2^{11} \left(1 + \frac{6}{\sqrt{(x^2 - 2)}} \right) dx \quad (3)$$



Q2

3.

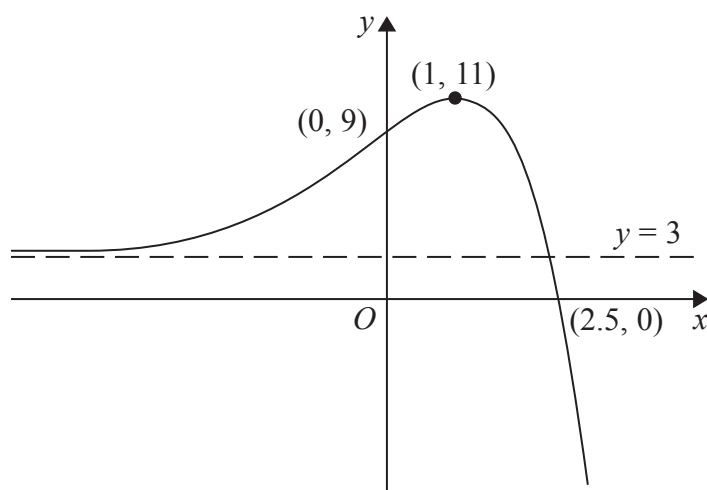


Figure 2

Figure 2 shows a sketch of part of the curve with equation $y = f(x)$.
The curve crosses the coordinate axes at the points $(2.5, 0)$ and $(0, 9)$, has a stationary point at $(1, 11)$, and has an asymptote $y = 3$

On **separate** diagrams, sketch the curve with equation

(a) $y = 3f(x)$ (3)

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

On each diagram show clearly the coordinates of the points of intersection of the curve with the two coordinate axes, the coordinates of the stationary point, and the equation of the asymptote.



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Question 3 continued

Q3

(Total 6 marks)

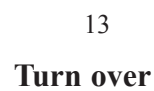


Q4



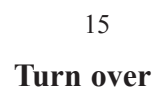


(Total 7 marks)



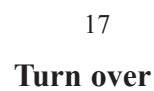


(Total 8 marks)





(Total 9 marks)



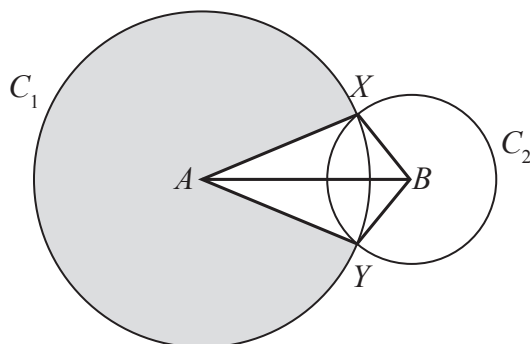


Figure 3

Given that the distance between the centres of the circles is 12 cm,

- (a) calculate the size of the acute angle XAB , giving your answer in radians to 3 significant figures, (2)
- (b) find the area of the major sector of circle C_1 , shown shaded in Figure 3, (3)
- (c) find the area of the kite $AYBX$. (3)

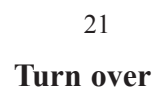


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Question 9 continued

[illegible]

(Total 8 marks)



10.

$$f(x) = 6x^3 + ax^2 + bx - 5$$

where a and b are constants.

When $f(x)$ is divided by $(x + 1)$ there is no remainder.

When $f(x)$ is divided by $(2x - 1)$ the remainder is -15

(a) Find the value of a and the value of b .

(5)

(b) Factorise $f(x)$ completely.

(4)







(Total 9 marks)



11.

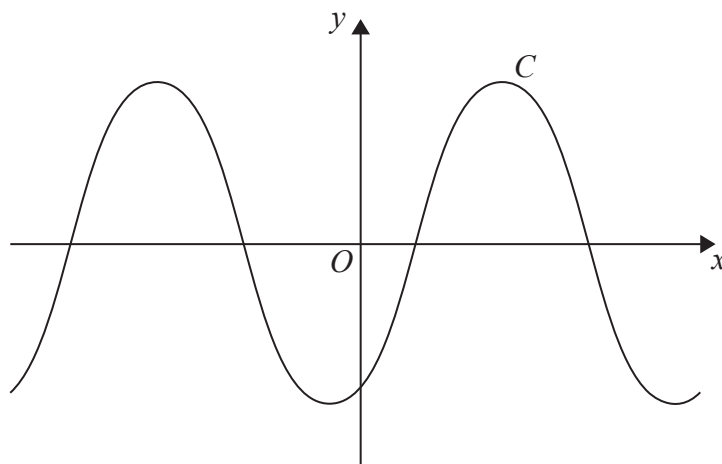


Figure 4

Figure 4 shows a sketch of the curve C with equation $y = \sin(x - 60^\circ)$, $-360^\circ \leq x \leq 360^\circ$

- (a) Write down the exact coordinates of the points at which C meets the two coordinate axes.
- (3)**
- (b) Solve, for $-360^\circ \leq x \leq 360^\circ$,

$$4 \sin(x - 60^\circ) = \sqrt{6} - \sqrt{2}$$

showing each stage of your working.



(Total 8 marks)



- (3)

- (4)

- (3)

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[illegible]

[illegible]

(Total 10 marks)

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[illegible]

(Total 15 marks)



$$3 \sin x + 7 \cos x = 0$$

(4)

$$10 \cos^2 \theta + \cos \theta = 11 \sin^2 \theta - 9$$

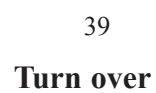
(6)

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(Total 10 marks)



15.

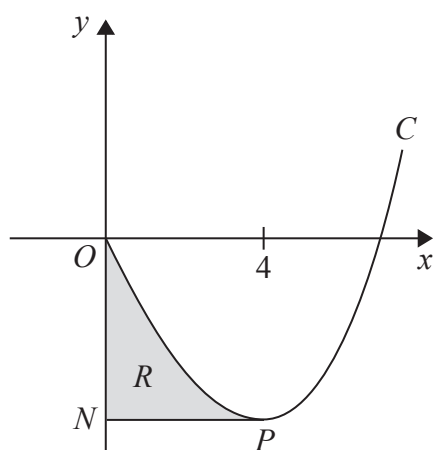


Figure 5

Figure 5 shows a sketch of part of the curve C with equation

$$y = x^3 + 10x^{\frac{3}{2}} + kx, \quad x \geq 0$$

where k is a constant.

- (a) Find $\frac{dy}{dx}$ (2)

The point P on the curve C is a minimum turning point.
Given that the x coordinate of P is 4

- (b) show that $k = -78$ (2)

The line through P parallel to the x -axis cuts the y -axis at the point N .

The finite region R , shown shaded in Figure 5, is bounded by C , the y -axis and PN .

- (c) Use integration to find the area of R . (7)





[illegible]



(Total 11 marks)

TOTAL FOR PAPER: 125 MARKS

END

