

Please check the examination details below before entering your candidate information

Candidate surname		Other names	
Pearson Edexcel		Centre Number	Candidate Number
International			
Advanced Level			
Tuesday 8 January 2019			
Morning (Time: 1 hour 30 minutes)		Paper Reference WMA11/01	
Mathematics			
Advanced Subsidiary			
Pure Mathematics P1			
You must have: Mathematical Formulae and Statistical Tables (Lilac), calculator			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).
- **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 12 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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[illegible]

1. Find

$$\int \left(\frac{2}{3}x^3 - \frac{1}{2x^3} + 5 \right) dx$$

simplifying your answer.

(4)



Q1

(Total 4 marks)

Turn over



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2. Given

$$\frac{3^x}{3^{4y}} = 27\sqrt{3}$$

find y as a simplified function of x .

(3)

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Q2

(Total 3 marks)

Turn over



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(b) Find the equation of l_2 in the form $y = mx + c$, where m and c are constants. (3)



Q3

(Total 5 marks)

7



Q4

(Total 3 marks)

Q4

Turn over



Q5

(Total 6 marks)



Turn over



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6. (Solutions based entirely on graphical or numerical methods are not acceptable.)

Given

$$f(x) = 2x^{\frac{5}{2}} - 40x + 8 \quad x > 0$$

(a) solve the equation $f'(x) = 0$ (4)

(b) solve the equation $f''(x) = 5$ (3)

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Q6

13

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(Total 7 marks)

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Q7

(Total 6 marks)

Turn over



8.

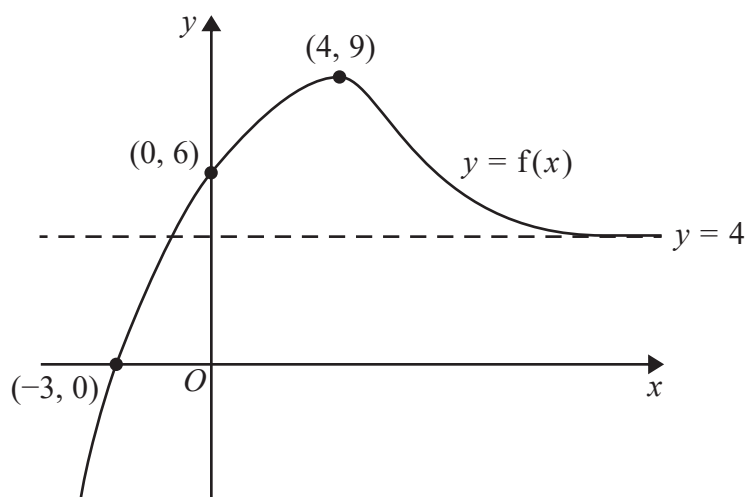


Figure 4

The curve C with equation $y = f(x)$ is shown in Figure 4.

The curve C

- has a single turning point, a maximum at $(4, 9)$
- crosses the coordinate axes at only two places, $(-3, 0)$ and $(0, 6)$
- has a single asymptote with equation $y = 4$

as shown in Figure 4.

(a) State the equation of the asymptote to the curve with equation $y = f(-x)$. (1)

(b) State the coordinates of the turning point on the curve with equation $y = f\left(\frac{1}{4}x\right)$. (1)

Given that the line with equation $y = k$, where k is a constant, intersects C at exactly one point,

(c) state the possible values for k . (2)

The curve C is transformed to a new curve that passes through the origin.

(d) (i) Given that the new curve has equation $y = f(x) - a$, state the value of the constant a .

(ii) Write down an equation for another single transformation of C that also passes through the origin. (2)

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Q8

(Total 6 marks)

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9. The equation

$$\frac{3}{x} + 5 = -2x + c$$

where c is a constant, has no real roots.

Find the range of possible values of c .

(7)

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Q9

19

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(Total 7 marks)

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Given that the area of the sector is 6 cm^2 and that the perimeter of the sector is 10 cm ,

$$3\theta^2 - 13\theta + 12 = 0 \quad (4)$$

(b) Hence find possible values of r and θ . (3)

Q10

4

Turn over

(Total 7 marks)



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Question 11 continued

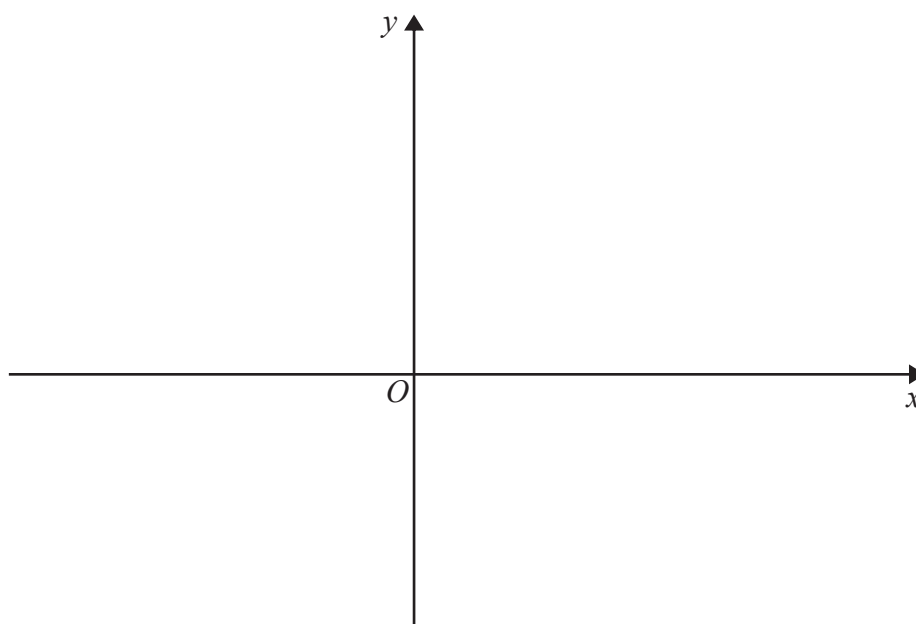


Diagram 1



Question 11 continued

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Lined area for writing the answer to Question 11.



Q11

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Question 12 continued

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Question 12 continued

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Q12

(Total 9 marks)

TOTAL FOR PAPER IS 75 MARKS

