

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 GCSE

Tuesday 21 May 2024

Morning (Time: 2 hours)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">Paper reference</td> <td style="padding: 2px 5px; font-weight: bold; font-size: 1.2em;">4PM1/01R</td> </tr> </table>	Paper reference	4PM1/01R
Paper reference	4PM1/01R		

Further Pure Mathematics

PAPER 1R



Calculators may be used.	Total Marks
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Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- You must **NOT** write anything on the formulae page.
Anything you write on the formulae page will gain NO credit.

Information

- The total mark for this paper is 100.
- 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.
- Check your answers if you have time at the end.

Turn over ►

P74099A

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Pearson

International GCSE in Further Pure Mathematics Formulae sheet

MensurationSurface area of sphere = $4\pi r^2$ Curved surface area of cone = $\pi r \times$ slant heightVolume of sphere = $\frac{4}{3}\pi r^3$ **Series****Arithmetic series**Sum to n terms, $S_n = \frac{n}{2}[2a + (n-1)d]$ **Geometric series**Sum to n terms, $S_n = \frac{a(1-r^n)}{(1-r)}$ Sum to infinity, $S_\infty = \frac{a}{1-r}$ $|r| < 1$ **Binomial series** $(1+x)^n = 1 + nx + \frac{n(n-1)}{2!}x^2 + \dots + \frac{n(n-1)\dots(n-r+1)}{r!}x^r + \dots$ for $|x| < 1, n \in \mathbb{Q}$ **Calculus****Quotient rule (differentiation)**

$$\frac{d}{dx} \left(\frac{f(x)}{g(x)} \right) = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$

Trigonometry**Cosine rule**In triangle ABC : $a^2 = b^2 + c^2 - 2bc \cos A$

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\sin(A+B) = \sin A \cos B + \cos A \sin B$$

$$\sin(A-B) = \sin A \cos B - \cos A \sin B$$

$$\cos(A+B) = \cos A \cos B - \sin A \sin B$$

$$\cos(A-B) = \cos A \cos B + \sin A \sin B$$

$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

$$\tan(A-B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

Logarithms

$$\log_a x = \frac{\log_b x}{\log_b a}$$

DO NOT WRITE IN THIS AREA

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DO NOT WRITE IN THIS AREA



Question 2 continued

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DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Handwriting practice area consisting of 28 horizontal dotted lines.

(Total for Question 2 is 8 marks)



Question 3 continued

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DO NOT WRITE IN THIS AREA

Area with horizontal dotted lines for writing answers.

(Total for Question 3 is 8 marks)



Question 4 continued

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DO NOT WRITE IN THIS AREA

Area with horizontal dotted lines for writing answers.

(Total for Question 4 is 9 marks)



Question 5 continued

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DO NOT WRITE IN THIS AREA

A large rectangular area with a rounded border, containing numerous horizontal dotted lines for writing.



Question 5 continued

Area with horizontal dotted lines for writing answers.

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DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



Question 5 continued

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Area with horizontal dotted lines for writing.

(Total for Question 5 is 11 marks)



Question 6 continued

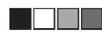
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Handwriting practice area consisting of 25 horizontal dotted lines.

(Total for Question 6 is 6 marks)



7 The curve C has equation $y = -\log_4(x + 4)$

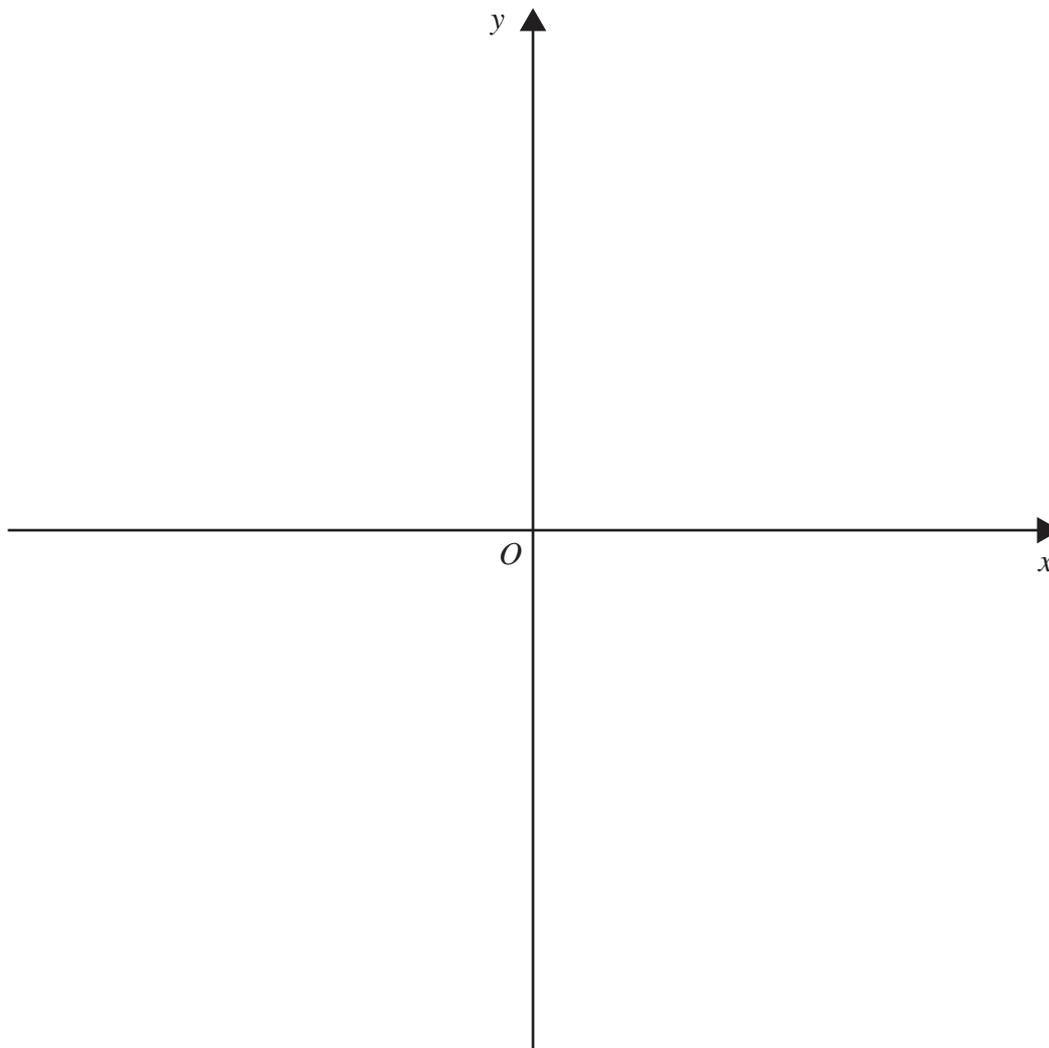
(a) Using the axes below, sketch the graph of C .

Label the coordinates of the points of intersection of C with the coordinate axes and the equation of any asymptote to C .

(4)

(b) Solve the equation $\log_{(x+4)} 256 - \log_4(x + 4) = 0$

(5)



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Question 7 continued

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Handwriting practice area consisting of 28 horizontal dotted lines.

(Total for Question 7 is 9 marks)



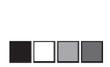
Question 8 continued

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DO NOT WRITE IN THIS AREA

Area with horizontal dotted lines for writing.



Question 8 continued

Area with horizontal dotted lines for writing answers.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



Question 8 continued

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DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Handwriting practice area consisting of 28 horizontal dotted lines.

(Total for Question 8 is 10 marks)



Question 9 continued

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DO NOT WRITE IN THIS AREA

Area with horizontal dotted lines for writing.



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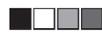
DO NOT WRITE IN THIS AREA

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Question 9 continued

Area with horizontal dotted lines for writing answers.

(Total for Question 9 is 12 marks)



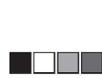
Question 10 continued

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DO NOT WRITE IN THIS AREA

Area with horizontal dotted lines for writing.



Question 10 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Area for writing answers, consisting of multiple horizontal dotted lines.

(Total for Question 10 is 12 marks)



Question 11 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Handwriting practice area consisting of 25 horizontal dotted lines.



