

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

Friday 14 November 2025

Morning (Time: 2 hours)	Paper reference	4PM1/02
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Further Pure Mathematics

PAPER 2



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 ▶

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International GCSE in Further Pure Mathematics Formulae sheet

Mensuration

Surface area of sphere = $4\pi r^2$

Curved surface area of cone = $\pi r \times$ slant height

Volume 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

$$(1+x)^n = 1 + nx + \frac{n(n-1)}{2!}x^2 + \dots + \frac{n(n-1)\dots(n-r+1)}{r!}x^r + \dots \quad \text{for } |x| < 1, n \in \mathbb{Q}$$

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

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

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Question 2 continued

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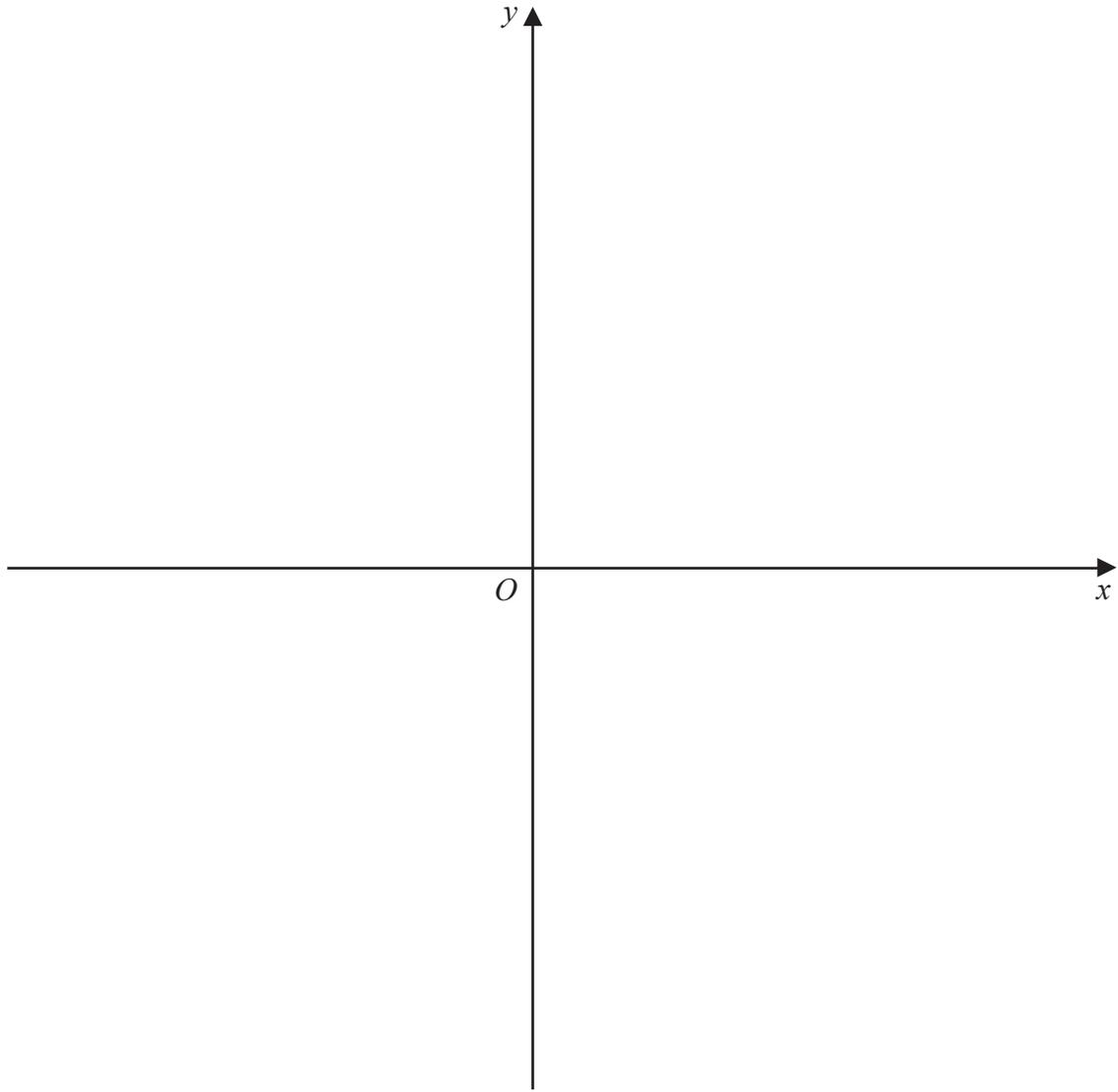
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(Total for Question 2 is 5 marks)



Question 3 continued



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(Total for Question 3 is 8 marks)



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Question 4 continued

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(Total for Question 4 is 9 marks)



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Question 5 continued

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(Total for Question 5 is 10 marks)



Question 6 continued

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(Total for Question 6 is 8 marks)



7 $f(x) = 2x^3 + Ax^2 + Bx - 20$ where A and B are constants.

Given that

- $(2x + 1)$ is a factor of $f(x)$
- when $f'(x)$ is divided by $(x - 1)$ the remainder is -27

(a) show that $A = 3$ and find the value of B (5)

(b) Hence, using algebra, solve the equation $f(x) = 0$ (3)

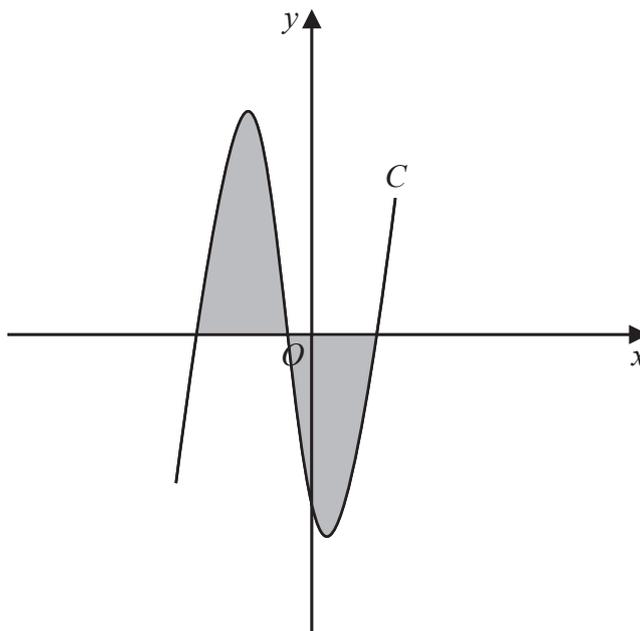


Figure 2

Figure 2 shows a sketch of part of the curve C with equation $y = f(x)$

(c) Use calculus to find the exact area of the finite region bounded by C and the x -axis, shown shaded in Figure 2 (4)

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Question 7 continued

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Question 7 continued

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(Total for Question 7 is 12 marks)



8 Solve, using an algebraic method, the simultaneous equations

$$\log_{27} x^3 - \log_3 y = 2$$

$$\log_6 (x + 3y) = 3$$

(8)

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Question 8 continued

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(Total for Question 8 is 8 marks)



Question 9 continued

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Question 9 continued

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(Total for Question 9 is 16 marks)



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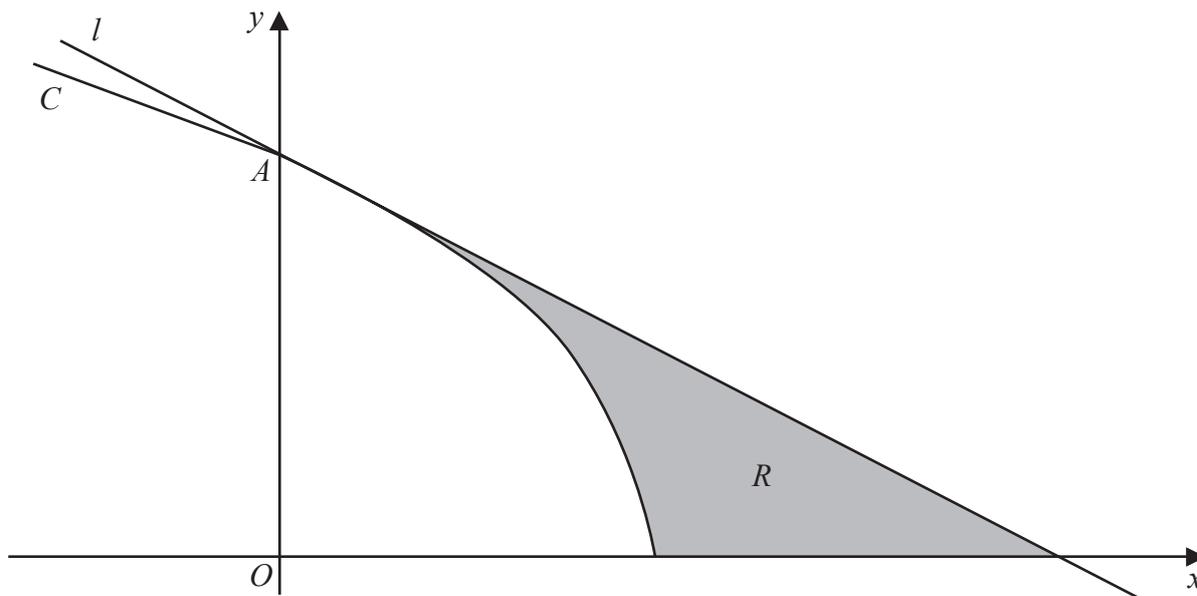


Figure 3

Figure 3 shows part of the curve C with equation $y = 3\sqrt{4-x}$ and part of the line l with equation $px + qy + r = 0$ where p and r are integers and q is prime.

The curve C cuts the y -axis at the point A

The line l is the tangent to C at A

- (a) Find the value of p , the value of q and the value of r (5)

The finite region R , shown shaded in Figure 3, is rotated through 360° about the x -axis.

- (b) Use algebraic integration to find the volume of the solid formed.
Give your answer in terms of π (5)

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Question 10 continued

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Question 10 continued

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Question 10 continued

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(Total for Question 10 is 10 marks)



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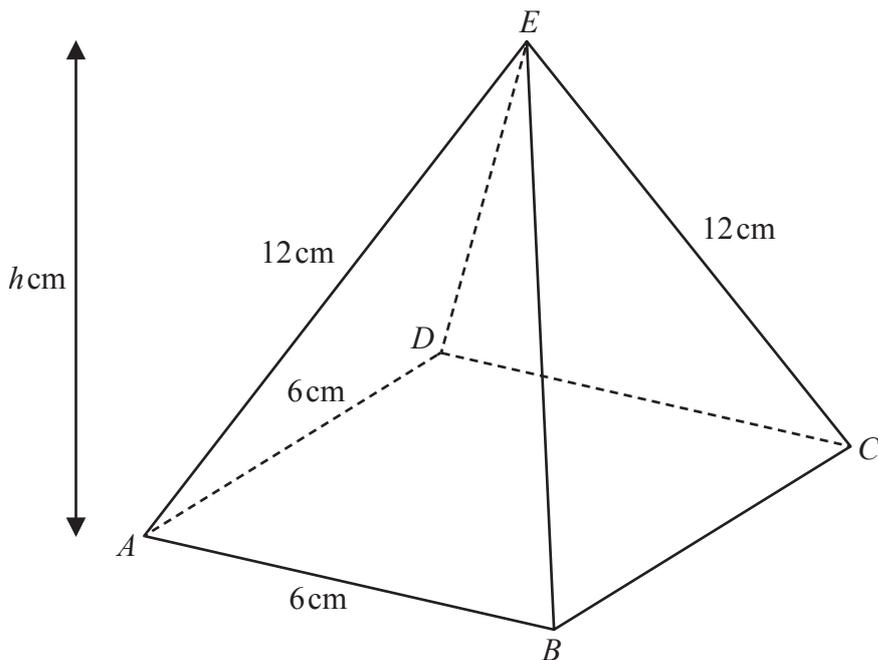


Diagram NOT accurately drawn

Figure 4

Figure 4 shows a right pyramid $ABCDE$ with

- vertex E
- horizontal square base $ABCD$ of side 6 cm
- $EA = EB = EC = ED = 12$ cm
- vertical height of h cm

(a) Show that $h = 3\sqrt{14}$ (3)

(b) Find, in degrees to one decimal place, the size of the angle between EB and the plane $ABCD$ (2)

The midpoint of AE is P and the midpoint of BE is Q

(c) Find, to the nearest degree, the size of the obtuse angle between the plane EPQ and the plane $PQCD$ (6)

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Question 11 continued

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Question 11 continued

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