

Please check the examination details below before entering your candidate information

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| Candidate surname    |                      |                      |                      |                      | Other names          |                      |                      |                      |  |
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**Pearson Edexcel International GCSE**

**Thursday 4 June 2026**

Afternoon (Time: 2 hours)

Paper reference **4PM1/02R**

**Further Pure Mathematics**

**PAPER 2R**



**Calculators may be used.**

Total Marks

### 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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**Pearson**

# International GCSE in Further Pure Mathematics Formulae sheet

## Mensuration

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

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

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,  $S_\infty = \frac{a}{1-r} \quad |r| < 1$

### 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  $ABC$ :  $a^2 = b^2 + c^2 - 2bc \cos A$

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

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

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

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

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

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

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

## Logarithms

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

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**You must write down all the stages in your working.**

- (1)

(b) Hence, or otherwise, show that  $(3x^2 - 17x + 10)$  is a factor of  $f(x)$

(3)

**(Total for Question 1 is 4 marks)**





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Question 2 continued

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(Total for Question 2 is 6 marks)



3 (i) Given that  $k$  is a constant such that

$$\frac{16^{(x+2)} - 4^{(2x+3)}}{2^x \times 8^{(x+1)}} = k$$

find the value of  $k$

(4)

(ii) Given that  $\frac{10}{\sqrt{12} - 2} = \frac{A\sqrt{3} + A}{B}$  where  $A$  and  $B$  are prime numbers

find the value of  $A$  and the value of  $B$

You must show **all** stages of your working.

(3)

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Question 3 continued

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(Total for Question 3 is 7 marks)



4 (a) On the grid opposite, draw the line with equation

(i)  $y = 5 - 2x$                       (ii)  $2y - 6x + 5 = 0$

(2)

(b) Show, by shading, the region  $R$  defined by the inequalities

$y \leq 5 - 2x$                        $x \geq -2$                        $2y - 6x + 5 \geq 0$

(1)

For all points in  $R$  with coordinates  $(x, y)$

$P = 3x - 2y$

(c) Find the greatest value of  $P$

(4)

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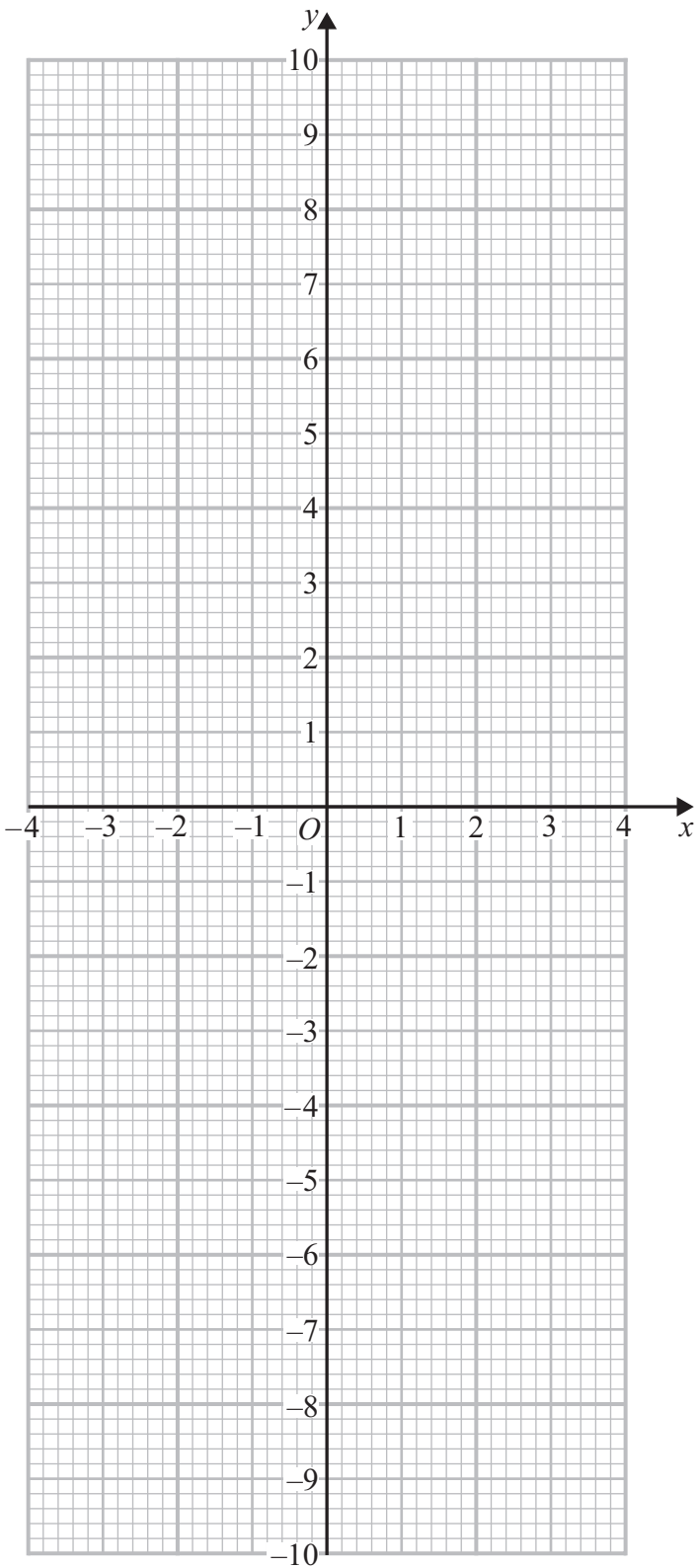


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Question 4 continued



Turn over for a spare grid if you need to redraw your graph.



Question 4 continued

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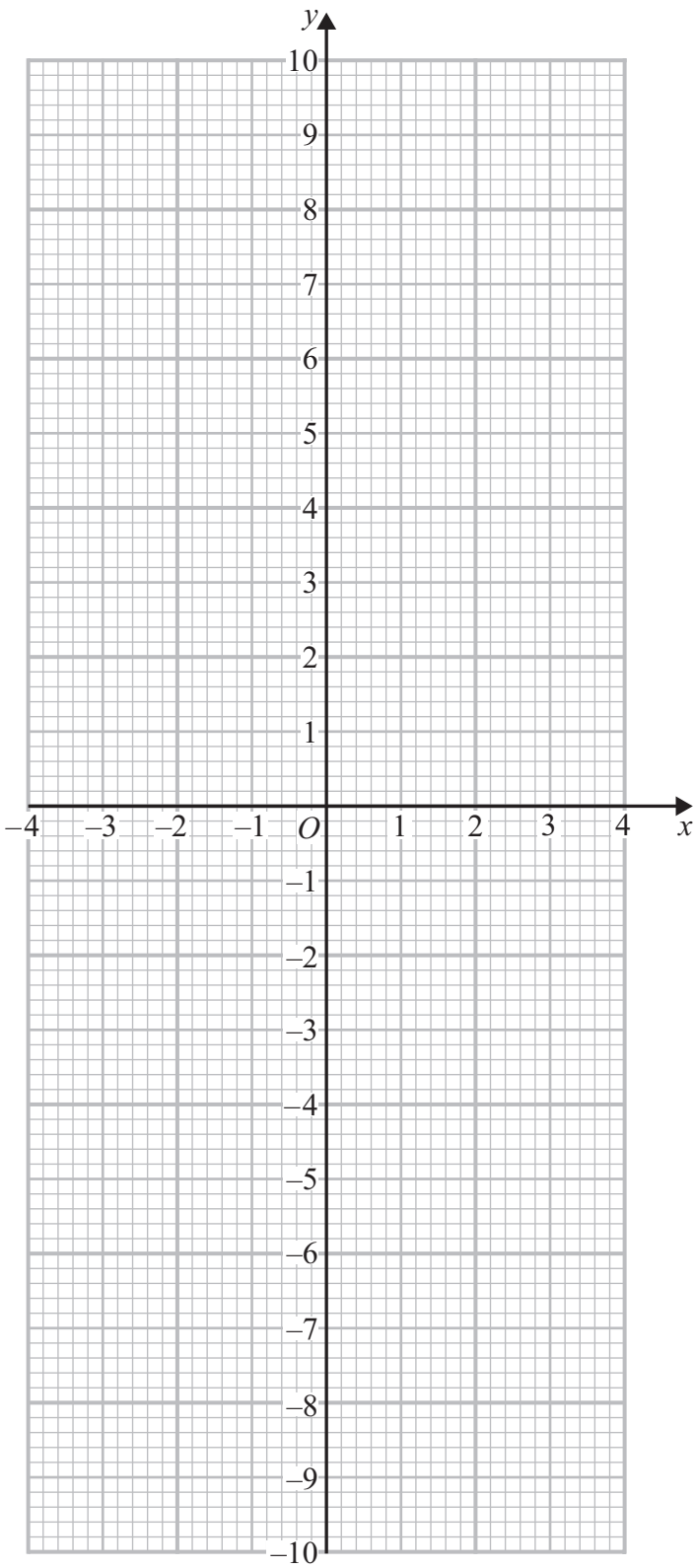
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Question 4 continued

Only use this grid if you need to redraw your graph.



(Total for Question 4 is 7 marks)



5

$$f(x) = 6x - x^2$$

Given that  $f(x)$  can be written in the form  $a(x + b)^2 + c$  where  $a$ ,  $b$  and  $c$  are constants

- (a) find the value of  $a$ , the value of  $b$  and the value of  $c$  (3)
- (b) Hence, or otherwise, find
  - (i) the maximum value of  $f(x)$
  - (ii) the value of  $x$  for which this maximum occurs. (2)

The curve  $C$  has equation  $y = f(x)$   
The line  $l$  has equation  $y = 3x$   
The finite region bounded by  $C$  and  $l$  is rotated through  $2\pi$  radians about the  $x$ -axis.

- (c) Use algebraic integration to find the exact volume of the solid generated. (6)

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Question 5 continued

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Question 5 continued

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Question 5 continued

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(Total for Question 5 is 11 marks)



- (6)

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Question 6 continued

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(Total for Question 6 is 9 marks)



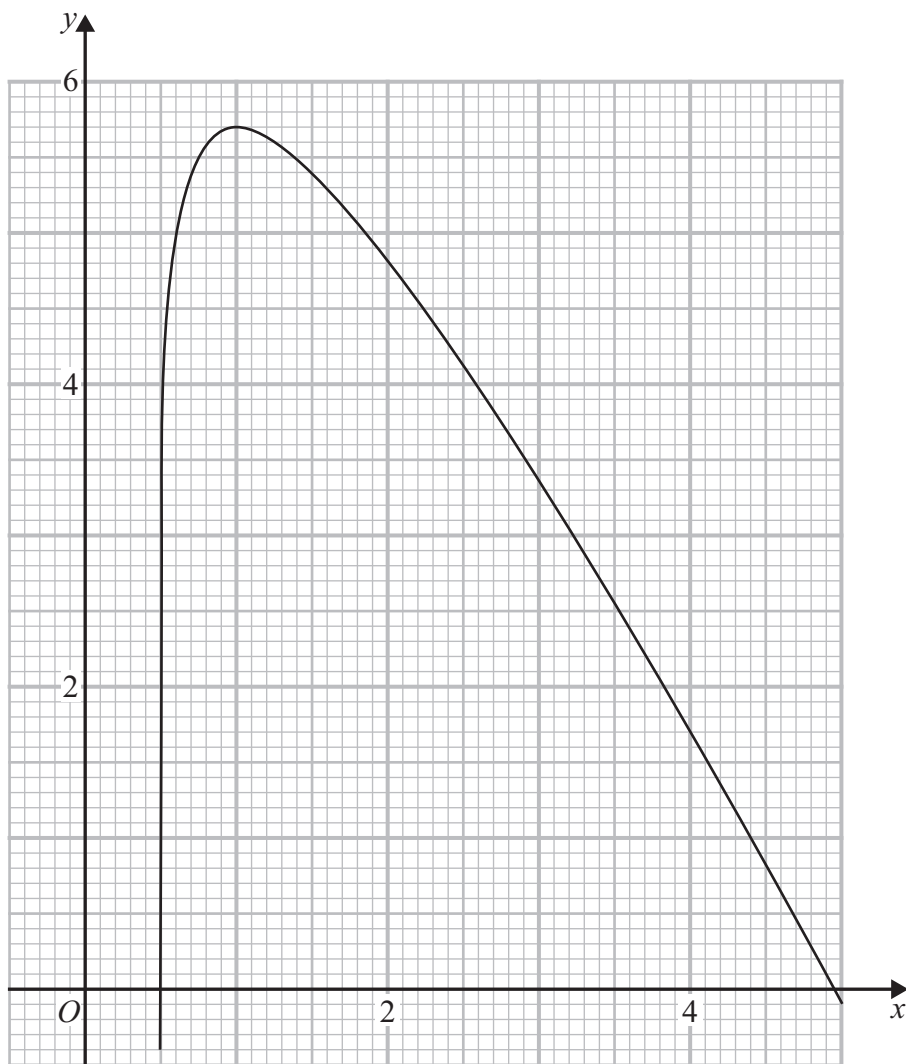


**Figure 1**

Figure 1 shows the curve with equation  $y = \log_3(4x - 2) - 2x + 7$  for  $0.5 < x < 5$

By drawing a suitable straight line on the grid, obtain an estimate, to one decimal place, of the root of the equation

$$3^{3x-6} + 2 = 4x$$

in the interval  $2 < x < 4$

(5)

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Question 7 continued

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(Total for Question 7 is 5 marks)



8 The line  $L$  passes through the points with coordinates  $(1, 5)$  and  $(7, -1)$

(a) Show that an equation of  $L$  is  $y + x = 6$

(2)

The curve  $S$  has equation  $(x - 7)^2 + (y - 5)^2 = 18$

(b) Show that  $L$  is a tangent to  $S$

(3)

Given that  $L$  is the tangent to  $S$  at the point  $A$

(c) find the coordinates of  $A$

(2)

(d) find an equation of the normal to  $S$  at  $A$

Give your answer in the form  $y = mx + c$

(3)

The point  $B$  is the intersection of the normal to  $S$  at  $A$  with another point on  $S$

(e) Find the exact length of  $AB$

(6)

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Question 8 continued

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Question 8 continued

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Question 8 continued

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(Total for Question 8 is 16 marks)



9  $O, X, Y$  and  $Z$  are fixed points such that

$$\overrightarrow{OX} = 4\mathbf{b} - 3\mathbf{a} \quad \overrightarrow{OY} = 6\mathbf{b} \quad \overrightarrow{OZ} = 12\mathbf{b} + 9\mathbf{a}$$

(a) Show that  $X, Y$  and  $Z$  are collinear.

(4)

The point  $M$  is the midpoint of  $OX$

The point  $N$  is the midpoint of  $OY$

The point  $P$  lies on  $OZ$  such that  $OP : PZ = 2 : 1$

(b) Find in its simplest form the ratio

Area of quadrilateral  $MXYN$  : Area of triangle  $YPZ$

(6)

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Question 9 continued

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Question 9 continued

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Question 9 continued

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(Total for Question 9 is 10 marks)



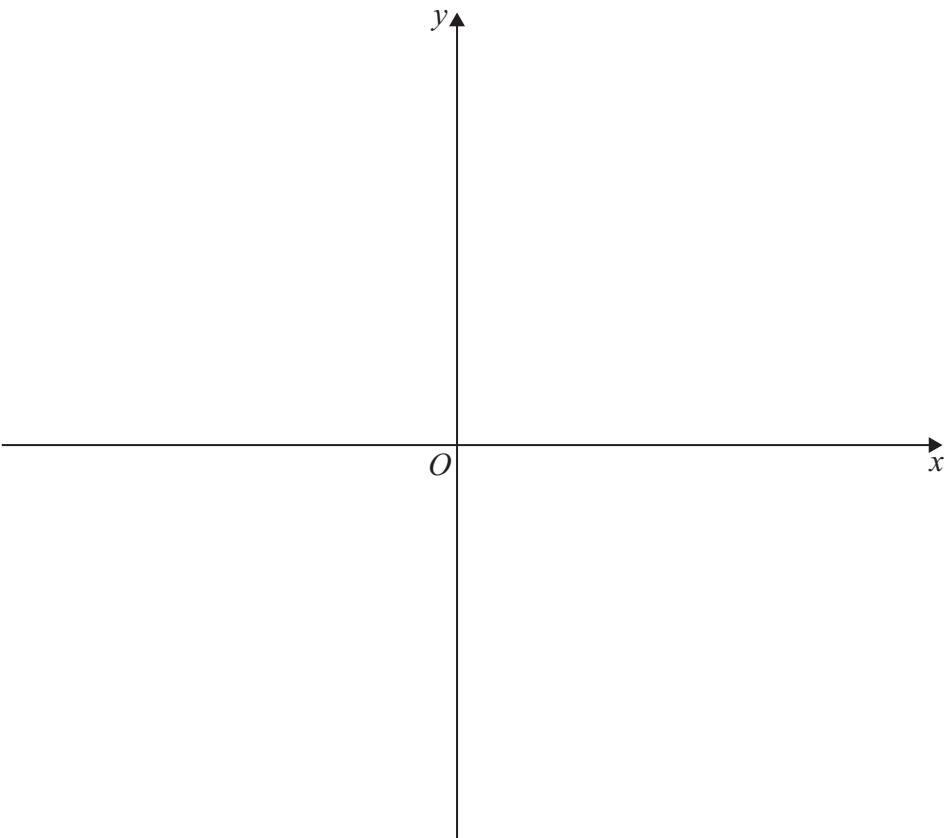


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Question 10 continued



Below the coordinate system, there are 15 horizontal dotted lines for writing the answer.

Question 10 continued

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Question 10 continued

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(Total for Question 10 is 12 marks)





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Question 11 continued

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Question 11 continued

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Question 11 continued

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(Total for Question 11 is 13 marks)

TOTAL FOR PAPER IS 100 MARKS



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