

Pearson Edexcel International Advanced Level

Tuesday 12 May 2026

Morning (Time: 1 hour 30 minutes)

**Paper
reference**

WMA12/01A

Mathematics

International Advanced Subsidiary/Advanced Level

Pure Mathematics P2

Question paper

You must have:

Answer book (sent separately).

Do not return this question paper with the answer book.

Turn over ►

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Pearson

1. **In this question you must show all stages of your working.**
Solutions relying on calculator technology are not acceptable.

$$f(x) = ax^3 + 7x^2 - 46x + 24$$

where a is a constant.

- (a) Find, in simplest form in terms of a , the remainder when $f(x)$ is divided by $(x - 2)$ (2)

Given that $(x - 2)$ is a factor of $f(x)$,

- (b) show that $a = 5$ (1)

- (c) factorise $f(x)$ completely. (4)

(Total for Question 1 is 7 marks)

2. **In this question you must show all stages of your working.**
Solutions relying entirely on calculator technology are not acceptable.

Given that k is a constant,

- (a) use algebraic integration to find

$$\int_1^4 kx^{-3} + 4x^{\frac{3}{2}} \, dx$$

giving the answer in simplest form in terms of k . (4)

- (b) Hence find the exact value of k for which

$$\int_1^4 kx^{-3} + 4x^{\frac{3}{2}} \, dx = 50$$

(2)

(Total for Question 2 is 6 marks)



3. The sequence $u_1, u_2, u_3, \dots$ satisfies

$$u_1 = 5 \qquad u_{n+1} = \frac{3}{2}u_n - \frac{1}{2}u_n^2 + 4$$

(a) Show that this sequence is periodic, stating its period.

(3)

(b) State the value of u_{200}

(1)

(c) Find, showing all steps of your working, the value of

$$\sum_{r=1}^{200} u_r$$

(3)

(Total for Question 3 is 7 marks)

4. **In this question you must show all stages of your working.
Solutions relying on calculator technology are not acceptable.**

The curve C has equation

$$y = 2x^3 + 7x + \frac{3}{x}$$

(a) Find the exact values of the x coordinates of the stationary points of C .

(4)

(b) Hence find the exact range of values of x for which C is increasing.

(2)

(Total for Question 4 is 6 marks)

5. The table below gives some x and y values for a function, $y = f(x)$.

The y values are given to 4 significant figures.

x	3	3.25	3.5	3.75	4	4.25	4.5
y	5.389	6.231	6.815	7.028	6.901	6.732	6.469

- (a) Use the trapezium rule with all the y values in the table to find an estimate for

$$\int_3^{4.5} f(x) \, dx$$

giving the answer to 3 significant figures.

(3)

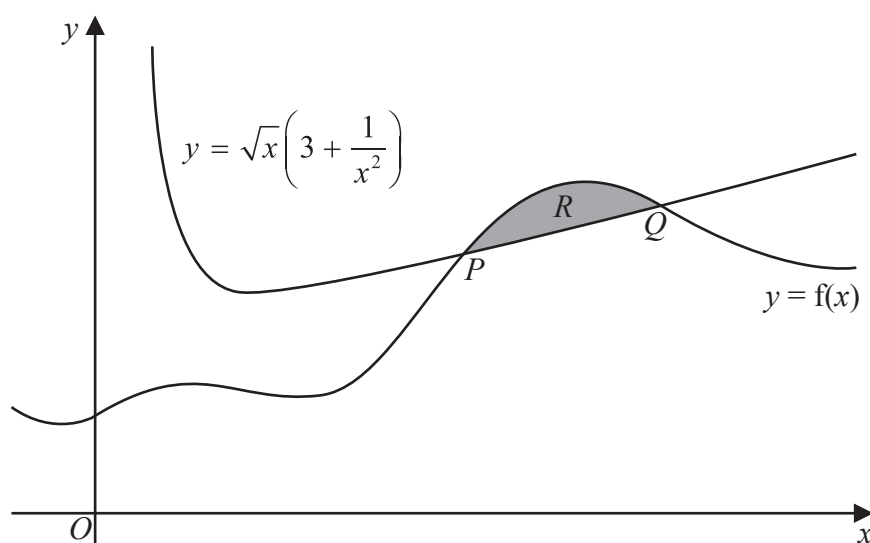


Figure 1

Figure 1 shows a sketch of the curve with equation $y = f(x)$ and the curve with equation $y = \sqrt{x} \left(3 + \frac{1}{x^2} \right)$

The finite region R , shown shaded in Figure 1, is bounded by both curves.

- (b) Find

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

(3)

The curves intersect at the points P and Q with x coordinates 3 and 4.5 respectively, as shown in Figure 1.

- (c) Use the answer to part (a) and the answer to part (b) to find an estimate for the area of R . Give the answer to 2 significant figures.

(2)

(Total for Question 5 is 8 marks)

6. **In this question you must show all stages of your working.**
Solutions relying entirely on calculator technology are not acceptable.

(i) Solve, using logarithms,

$$7^{x+3} = 5$$

giving the answer to 3 significant figures.

(2)

(ii) (a) Show that the equation

$$18(\log_8 y)^2 + 5\log_8(64y^3) = 73$$

can be written as

$$6(\log_8 y)^2 + 5\log_8 y - 21 = 0$$

(3)

(b) Hence find the exact values of y for which

$$18(\log_8 y)^2 + 5\log_8(64y^3) = 73$$

(3)

(Total for Question 6 is 8 marks)

7. The circle C has equation

$$(x - 3)^2 + (y - 6)^2 = k$$

where k is a positive constant.

(a) Write down the coordinates of the centre of C .

(1)

The line l passes through the origin, O , and the centre of C .

(b) Find an equation for the line l , giving the answer in the form $y = mx$, where m is a constant.

(2)

Given that

- the point A is the point on C closest to O
- the distance OA is $\sqrt{5}$

(c) find the two possible values of k .

(4)

(Total for Question 7 is 7 marks)

8. (a) Find the first four terms, in ascending powers of x , of the binomial expansion of $(k + 4x)^{12}$, where k is a constant. Give each term in simplest form. (4)

Given that the coefficient of x^3 in this expansion is $\frac{55}{2}$

- (b) find the value of k . (2)

Using the value of k found in part (b) and the answer to part (a),

- (c) find the coefficient of y^3 in the expansion of

$$\left(y + \frac{2}{y}\right)(k + 4y^2)^{12}$$

(3)

(Total for Question 8 is 9 marks)



9.

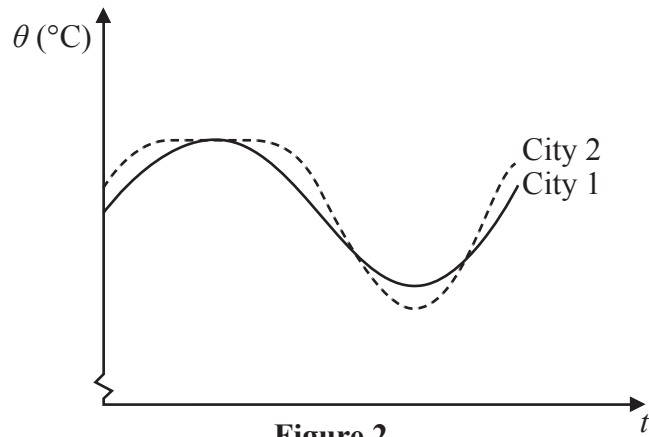


Figure 2

Figure 2 shows graphs modelling the temperature, in degrees Celsius, in two cities over the same 24-hour period from 8 am to 8 am.

The temperature, $\theta^\circ\text{C}$, in City 1 is modelled by the equation

$$\theta = 17 + 5 \sin\left(\frac{\pi t}{12}\right)$$

where t is the number of hours after 8 am.

- (a) Show that, according to the model, at 12 noon the temperature in City 1 is approximately 21.3°C .

(2)

The temperature, $\theta^\circ\text{C}$, in City 2 is modelled by the equation

$$\theta = 16 + 6 \sin\left(\frac{\pi t}{12}\right) + 3 \cos^2\left(\frac{\pi t}{12}\right)$$

where t is the number of hours after 8 am.

Use the equations of the models to answer parts (b) and (c).

When $t = T$ the temperature in each city is the same.

- (b) Show that T satisfies the equation

$$3 \sin^2\left(\frac{\pi T}{12}\right) - \sin\left(\frac{\pi T}{12}\right) - 2 = 0$$

(3)

- (c) Hence find the values of T for which the temperature in each city is the same, giving the answers to 3 significant figures where necessary.

You must show all stages of your working.

(Solutions relying entirely on calculator technology are not acceptable.)

(5)

(Total for Question 9 is 10 marks)

10. (i) Given that

- $f(n) = 168n - 119 - 24n^2$
- n is a positive integer less than 7

use proof by exhaustion to show that $f(n)$ is always a perfect square.

(3)

You may use the table on page 30 of the answer book to illustrate your answer.
The first 2 rows have been completed for you.

(ii) Given n is an integer with $n \geq r$, use the formula

$${}^nC_r = \frac{n!}{r!(n-r)!}$$

to prove that

$${}^nC_r + {}^nC_{r+1} = {}^{n+1}C_{r+1}$$

You must show all stages of your working.

(4)

(Total for Question 10 is 7 marks)

TOTAL FOR PAPER IS 75 MARKS



Please check the examination details below before entering your candidate information

Candidate surname		Other names	
Centre Number		Candidate Number	

Pearson Edexcel International Advanced Level

Tuesday 12 May 2026

Morning (Time: 1 hour 30 minutes) **Paper reference** **WMA12/01A**

Mathematics

International Advanced Subsidiary/Advanced Level

Pure Mathematics P2

Answer Book

You must have:

Question paper (sent separately)

Mathematical Formulae and Statistical Tables (Yellow), calculator

Total Marks

Candidates may use any calculator permitted by Pearson regulations. 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 10 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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Question 1

Write the answer to Question 1 on these 2 pages.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

(Total for Question 1 is 7 marks)



Question 2

Write the answer to Question 2 on these 2 pages.

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DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

(Total for Question 2 is 6 marks)



Question 3

Write the answer to Question 3 on these 2 pages.

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DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

(Total for Question 3 is 7 marks)



Question 4

Write the answer to Question 4 on these 2 pages.

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DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

(Total for Question 4 is 6 marks)



Question 5

Write the answer to Question 5 on these 4 pages.

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DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

Question 5 continued

Lined area for writing the answer to Question 5.



Question 5 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

(Total for Question 5 is 8 marks)



Question 6

Write the answer to Question 6 on these 4 pages.

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DO NOT WRITE IN THIS AREA

Question 6 continued

Lined area for writing the answer to Question 6.



Question 6 continued

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DO NOT WRITE IN THIS AREA

(Total for Question 6 is 8 marks)



Question 7

Write the answer to Question 7 on these 4 pages.

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DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

Question 7 continued

Lined area for writing the answer to Question 7.



Question 7 continued

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DO NOT WRITE IN THIS AREA

(Total for Question 7 is 7 marks)



Question 8

Write the answer to Question 8 on these 4 pages.

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DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

Question 8 continued

Handwriting practice area with horizontal lines.



Question 8 continued

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DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

(Total for Question 8 is 9 marks)



Question 9

Write the answer to Question 9 on these 4 pages.

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DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

Question 9 continued

Handwriting practice area with 25 horizontal lines.



Question 9 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

(Total for Question 9 is 10 marks)



Question 10

Write the answer to Question 10 on these 3 pages.

You may not need to use all of the rows in the table

Value of n	Value of $f(n)$
1	$25 = 5^2$
2	$121 = 11^2$



DO NOT WRITE IN THIS AREA

Question 10 continued

Lined area for writing the answer to Question 10.



Question 10 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(Total for Question 10 is 7 marks)

TOTAL FOR PAPER IS 75 MARKS

