Pearson Edexcel International Advanced Level

Friday 16 January 2026

Morning (Time: 1 hour 30 minutes)

Paper reference **WFM02/01A**

Mathematics

International Advanced Subsidiary/Advanced Level
Further Pure Mathematics F2
Question paper

You must have: Answer book (sent separately).
Do not return this question paper with the answer book.

Turn over

P87590A

C:1/1/1/1/

P 8 7 5 9 0 A

Pearson

1. Solve the equation

$$z^5 = 32$$

Give your answers in the form $r(\cos\theta + \mathrm{i}\sin\theta)$, where $r > 0$ and $0 \leqslant \theta < 2\pi$

(5)

(Total for Question 1 is 5 marks)

---

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

Use algebra to find the set of values of x for which

$$|x^2 - 9| < |1 - 2x|$$

(6)

(Total for Question 2 is 6 marks)

3.

$$(\cos x)\frac{\mathrm{d}y}{\mathrm{d}x} + (\sin x)y = 2\cos^3 x\sin x - 3 \qquad 0 \leqslant x < \frac{\pi}{2}$$

(a) Find the general solution of this differential equation.
Give your answer in the form $y = \mathrm{f}(x)$.

(7)

(b) Find the particular solution of this differential equation for which $y = 3\sqrt{3}$ at $x = \frac{\pi}{3}$

Give your answer in the form $y = \mathrm{f}(x)$.

(3)

(Total for Question 3 is 10 marks)

---

4. (a) Express $\dfrac{4r+2}{r(r+1)(r+2)}$ in partial fractions.

(3)

(b) Hence, using the method of differences, prove that

$$\sum_{r=1}^{n} \frac{4r+2}{r(r+1)(r+2)} = \frac{n(an+b)}{2(n+1)(n+2)}$$

where a and b are constants to be found.

(5)

(Total for Question 4 is 8 marks)

---

5. Given that

$$(2-x^2)\frac{d^2y}{dx^2} + 5x\left(\frac{dy}{dx}\right)^2 = 3y$$

(a) show that

$$\frac{d^3y}{dx^3} = \frac{1}{(2-x^2)}\left(2x\frac{d^2y}{dx^2}\left(1-5\frac{dy}{dx}\right) - 5\left(\frac{dy}{dx}\right)^2 + 3\frac{dy}{dx}\right)$$

(5)

Given also that $y = 3$ and $\dfrac{dy}{dx} = \dfrac{1}{4}$ at $x = 0$

(b) obtain a series solution for y in ascending powers of x with simplified coefficients, up to and including the term in x^3

(4)

(Total for Question 5 is 9 marks)

---

6. (a) Find the general solution of the differential equation

$$\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 8y = 2x^2 + x$$

(8)

(b) Find the particular solution of this differential equation for which

$y = 1$ and $\dfrac{dy}{dx} = 0$ when $x = 0$

(5)

(Total for Question 6 is 13 marks)

7. (a) Show that

$$\left(z+\frac{1}{z}\right)^3\left(z-\frac{1}{z}\right)^3 = z^6 - \frac{1}{z^6} - k\left(z^2 - \frac{1}{z^2}\right)$$

where k is a constant to be found.

(3)

Given that $z = \cos\theta + \mathrm{i}\sin\theta$, where θ is real,

(b) show that

(i) $z^n + \dfrac{1}{z^n} = 2\cos n\theta$

(ii) $z^n - \dfrac{1}{z^n} = 2\mathrm{i}\sin n\theta$

(3)

(c) Hence show that

$$\cos^3\theta\sin^3\theta = \frac{1}{32}\,(3\sin 2\theta - \sin 6\theta)$$

(4)

(d) Use algebraic integration to find the exact value of

$$\int_0^{\frac{\pi}{8}} \cos^3\theta\sin^3\theta\,\mathrm{d}\theta$$

(4)

(Total for Question 7 is 14 marks)

8.

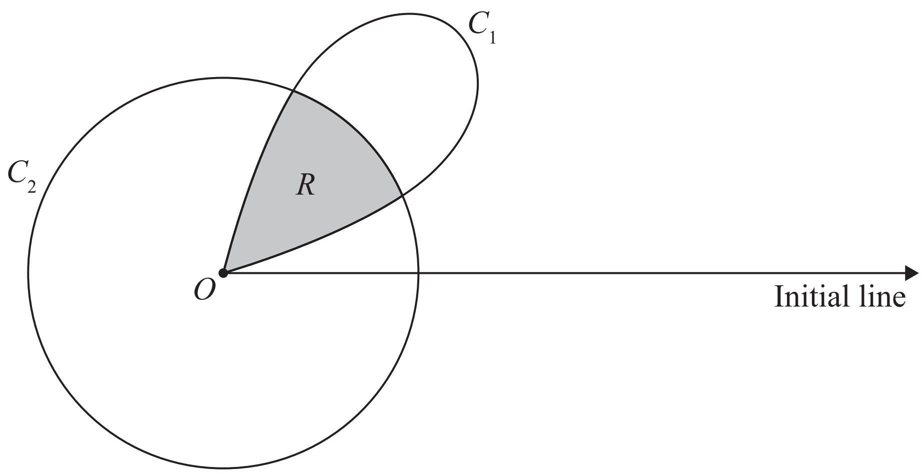

Figure 1

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

Figure 1 shows the curve C_1 with polar equation $r = 2a\sin 2\theta,\ 0 \leqslant \theta \leqslant \frac{\pi}{2}$, and the circle C_2 with polar equation $r = a$, $0 \leqslant \theta \leqslant 2\pi$, where a is a positive constant.

(a) Find, in terms of a, the polar coordinates of the points where the curve C_1 meets the circle C_2

(3)

The regions enclosed by the curve C_1 and the circle C_2 overlap and the common region R is shaded in Figure 1.

(b) Use algebraic integration to find the area of the shaded region R, giving your answer in the form $\frac{1}{12}a^2\left(p\pi + q\sqrt{3}\right)$, where p and q are integers.

(7)

(Total for Question 8 is 10 marks)

TOTAL FOR PAPER IS 75 MARKS

BLANK PAGE

BLANK PAGE

BLANK PAGE

Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

Pearson Edexcel International Advanced Level

Friday 16 January 2026

Morning (Time: 1 hour 30 minutes) | **Paper reference** **WFM02/01A**

Mathematics

International Advanced Subsidiary/Advanced Level
Further Pure Mathematics F2
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 8 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

Pearson

Question 1

Write the answer to Question 1 on these 2 pages

Question 1 continued

This is the end of Question 1 answer space. Please turn the page for Question 2 answer space.

(Total for Question 1 is 5 marks)

Question 2

Write the answer to Question 2 on these 2 pages

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

Question 2 continued

This is the end of Question 2 answer space. Please turn the page for Question 3 answer space.

(Total for Question 2 is 6 marks)

Question 3

Write the answer to Question 3 on these 4 pages

Question 3 continued

Question 3 continued

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

Question 3 continued

This is the end of Question 3 answer space. Please turn the page for Question 4 answer space.

(Total for Question 3 is 10 marks)

Question 4

Write the answer to Question 4 on these 4 pages

Question 4 continued

Question 4 continued

Question 4 continued

This is the end of Question 4 answer space. Please turn the page for Question 5 answer space.

(Total for Question 4 is 8 marks)

Question 5

Write the answer to Question 5 on these 4 pages

Question 5 continued

Question 5 continued

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

Question 5 continued

This is the end of Question 5 answer space. Please turn the page for Question 6 answer space.

(Total for Question 5 is 9 marks)

Question 6

Write the answer to Question 6 on these 4 pages

Question 6 continued

Question 6 continued

Question 6 continued

This is the end of Question 6 answer space. Please turn the page for Question 7 answer space.

(Total for Question 6 is 13 marks)

Question 7

Write the answer to Question 7 on these 4 pages

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

Question 7 continued

Question 7 continued

Question 7 continued

This is the end of Question 7 answer space. Please turn the page for Question 8 answer space.

(Total for Question 7 is 14 marks)

Question 8

Write the answer to Question 8 on these 3 pages

Question 8 continued

Question 8 continued

(Total for Question 8 is 10 marks)

TOTAL FOR PAPER IS 75 MARKS