

Pearson Edexcel International Advanced Level

Monday 1 June 2026

Afternoon (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

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Pearson

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

Use algebra to determine the values of x for which

$$\frac{2}{x+3} < 1 - \frac{3}{x-2} \quad (7)$$

(Total for Question 1 is 7 marks)

2. (a) Show that, for $r \geq 0$

$$\frac{1}{(r+1)!} - \frac{1}{(r+2)!} \equiv \frac{r+1}{(r+2)!} \quad (2)$$

- (b) Hence use the method of differences to determine

$$\sum_{r=1}^n \frac{r+1}{(r+2)!}$$

giving the answer as a single fraction.

(3)

- (c) Using the answer to part (b) and making your method clear, determine the value of

$$\sum_{r=4}^{10} \frac{3r+3}{(r+2)!}$$

giving the answer to 3 significant figures.

(2)

(Total for Question 2 is 7 marks)



3. Given that

$$y = (1 - 2x)^2 \ln(1 - 2x) \quad x < \frac{1}{2}$$

(a) show that

$$\frac{d^3 y}{dx^3} = \frac{a}{1 - 2x}$$

where a is an integer to be determined.

(5)

(b) Hence determine the Maclaurin series expansion for y in ascending powers of x , up to and including the term in x^4 , giving each coefficient in simplest form.

(5)

(Total for Question 3 is 10 marks)

4. (a) Determine the general solution of the differential equation

$$4 \frac{d^2 y}{dx^2} - 4 \frac{dy}{dx} + y = 2e^{\frac{1}{2}x}$$

(7)

Given that $y = 1$ and $\frac{dy}{dx} = e^{\frac{1}{2}}$ at $x = 0$

(b) determine the particular solution of the differential equation.

(4)

(Total for Question 4 is 11 marks)

5. The transformation T from the z -plane, where $z = x + iy$, to the w -plane, where $w = u + iv$, is given by

$$w = 2 - \frac{3}{z + i} \quad z \neq -i$$

The half-line in the z -plane with equation $\arg z = \frac{\pi}{4}$ is mapped by T onto a circle C in the w -plane.

- (a) Determine the equation of C in the form

$$(u - a)^2 + (v - b)^2 = k$$

where a , b and k are constants.

(7)

- (b) Hence, or otherwise, determine

(i) the radius of C

(ii) the coordinates of the centre of C

(2)

(Total for Question 5 is 9 marks)

6. (a) Given that $z = \cos \theta + i \sin \theta$, show that

(i) $\frac{1}{2} \left(z + \frac{1}{z} \right) = \cos \theta$

(ii) $\frac{1}{2i} \left(z - \frac{1}{z} \right) = \sin \theta$

(2)

- (b) Hence show that

$$\sin^3 \theta \cos^4 \theta \equiv a \sin 7\theta + b \sin 5\theta + c \sin 3\theta + d \sin \theta$$

where a , b , c and d are constants to be determined.

(5)

- (c) Use the result from part (b) and algebraic integration to determine the exact value of

$$\int_0^{\frac{\pi}{2}} \sin^3 \theta \cos^4 \theta \, d\theta$$

(4)

(Total for Question 6 is 11 marks)



7. (a) Show that $e^{k\sin^2 x}$ is an integrating factor of the differential equation

$$\sec x \frac{dy}{dx} - 2y \sin x = e^{x + \sin^2 x}$$

where k is a constant to be determined.

(2)

- (b) Hence find the general solution of the differential equation.

(6)

Given that $y = 2$ at $x = 0$

- (c) determine the particular solution of the differential equation.

(2)

(Total for Question 7 is 10 marks)

8.

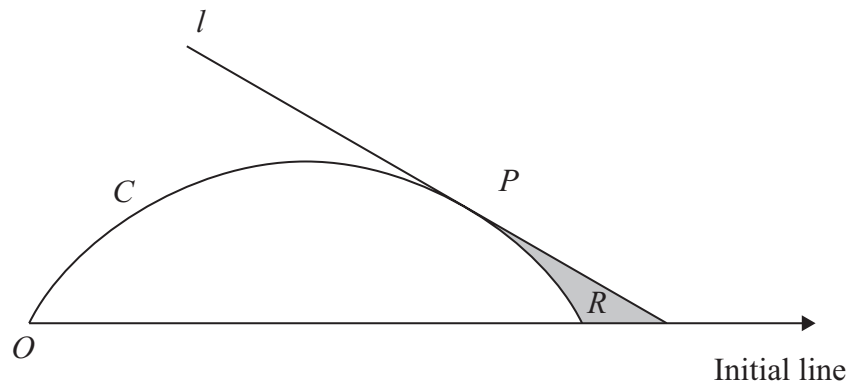


Figure 1

Figure 1 shows a sketch of the curve C with polar equation

$$r = 2 \cos \left(\theta + \frac{\pi}{6} \right) \quad 0 \leq \theta \leq \frac{\pi}{3}$$

and the line segment l with polar equation

$$r = \sec \left(\theta - \frac{\pi}{3} \right) \quad 0 \leq \theta \leq \frac{\pi}{3}$$

The line l is a tangent to C at the point P , as shown in Figure 1.

- (a) By solving simultaneous equations and using the identity $\cos \theta \equiv \sin \left(\theta + \frac{\pi}{2} \right)$

show that the polar coordinates of P are $\left(\sqrt{2}, \frac{\pi}{12} \right)$

(3)

The region R , shown shaded in Figure 1, is bounded by C , l and the initial line.

- (b) Use algebraic integration to show that the area of R is

$$a\sqrt{3} + b + c\pi$$

where a , b and c are rational numbers to be determined.

$$\left(\text{You may use } \sin \frac{\pi}{12} = \frac{\sqrt{6} - \sqrt{2}}{4} \text{ and } \cos \frac{\pi}{12} = \frac{\sqrt{6} + \sqrt{2}}{4} \text{ without justification.} \right)$$

(7)

(Total for Question 8 is 10 marks)

TOTAL FOR PAPER IS 75 MARKS



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Please check the examination details below before entering your candidate information

Candidate surname		Other names	
Centre Number		Candidate Number	

Pearson Edexcel International Advanced Level

Monday 1 June 2026

Afternoon (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.

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Question 1

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Question 2

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Question 2 continued

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Question 2 continued

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(Total for Question 2 is 7 marks)



Question 3

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Question 3 continued

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Question 3 continued

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(Total for Question 3 is 10 marks)



Question 4

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Question 4 continued

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Question 4 continued

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Question 5

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Question 5 continued

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Question 5 continued

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Question 6

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Question 6 continued

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Question 6 continued

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(Total for Question 6 is 11 marks)



Question 7

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Question 7 continued

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Question 7 continued

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(Total for Question 7 is 10 marks)



Question 8

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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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Question 8 continued

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(Total for Question 8 is 10 marks)

TOTAL FOR PAPER IS 75 MARKS

