Pearson Edexcel International Advanced Level

Monday 19 January 2026

Morning (Time: 1 hour 30 minutes)

Paper reference **WMA13/01A**

▲ △

Mathematics

International Advanced Level
Pure Mathematics P3
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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P 8 7 5 9 4 A

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

The curve C has equation

$$y = \frac{3x - 2}{(x - 2)^2} \qquad x \neq 2$$

The point P on C has x coordinate 4

Find an equation of the normal to C at the point P in the form $ax + by + c = 0$, where a, b and c are integers.

(6)

(Total for Question 1 is 6 marks)

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2. Given that

$$\mathrm{f}(x) = \frac{4}{3x+5} \qquad x > 0$$

$$\mathrm{g}(x) = \frac{1}{x} \qquad x > 0$$

(a) state the range of f,

(2)

(b) find f^{-1}

(3)

(c) find $\mathrm{fg}(x)$.

(1)

(d) Show that the equation $\mathrm{fg}(x) = \mathrm{gf}(x)$ has no real solutions.

(4)

(Total for Question 2 is 10 marks)

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

(i) (a) Divide $(x^2 - 3x + 6)$ by $(x + 2)$

(2)

(b) Hence find $\int \frac{x^2 - 3x + 6}{x + 2} \, dx$

(3)

(ii) Using algebraic integration, find the exact value of

$$\int_0^{\frac{\pi}{6}} \left(\cos\theta - \sin\theta\right)^2 \, d\theta$$

(5)

(Total for Question 3 is 10 marks)

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4. Given that

$$y = 8\tan(2x) \qquad -\frac{\pi}{4} < x < \frac{\pi}{4}$$

show that

$$\frac{dx}{dy} = \frac{A}{B + y^2}$$

where A and B are integers to be found.

(4)

(Total for Question 4 is 4 marks)

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

(a) Show that

$$\frac{\cot^2 x}{1 + \cot^2 x} \equiv \cos^2 x$$

(3)

(b) Hence solve, for $0 \leqslant x < 360°$

$$\frac{\cot^2 x}{1 + \cot^2 x} = 8\cos 2x + 2\cos x$$

Give each solution in degrees to one decimal place.

(5)

(Total for Question 5 is 8 marks)

6

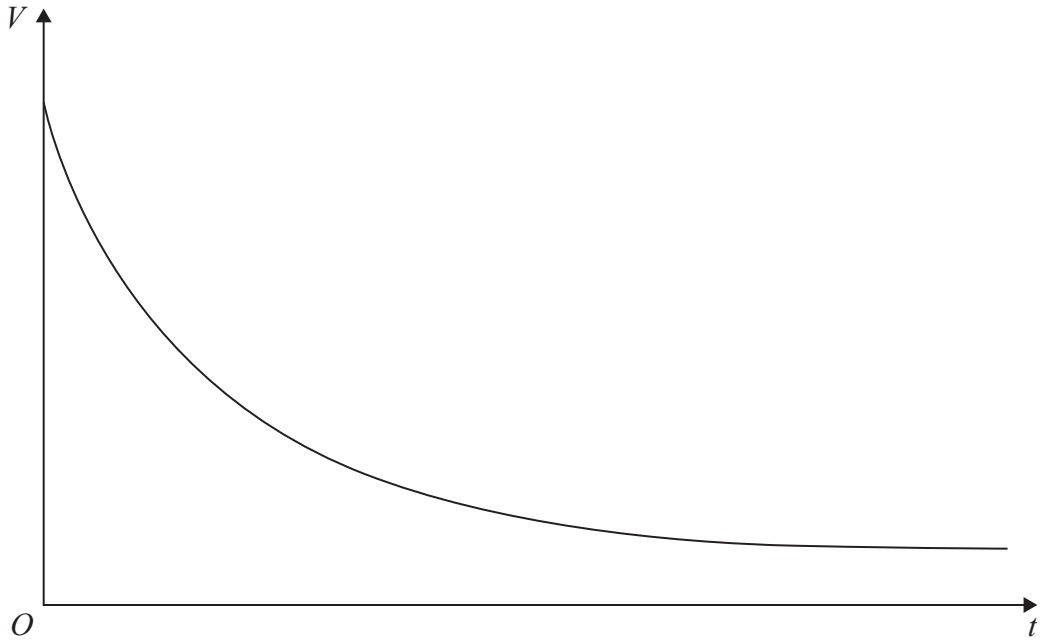

Figure 1

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

The value of a particular car is modelled by the formula

$$V = 18\,000e^{-0.2t} + 4000e^{-0.1t} + 1000 \qquad t \geqslant 0$$

where the value of the car is V pounds when the age of the car is t years.

A sketch of t against V is shown in Figure 1.

(a) State the range of V.

(2)

According to this model,

(b) find the rate at which the value of the car is decreasing when $t = 10$
Give your answer in pounds per year.

(3)

(c) Calculate the exact value of t when $V = 15\,000$ giving the answer in its simplest form.

(4)

(Total for Question 6 is 9 marks)

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

(a) Express $\sqrt{5}\cos\theta - 2\sin\theta$ in the form $R\cos(\theta + \alpha)$, where $R > 0$ and $0 < \alpha < \frac{\pi}{2}$

State the value of R and give the value of α to 4 significant figures.

(3)

(b) Solve, for $-\pi < \theta < \pi$,

$$\sqrt{5}\cos\theta - 2\sin\theta = 0.5$$

giving your answers to 3 significant figures.

(4)

$$f(x) = A\left(\sqrt{5}\cos\theta - 2\sin\theta\right) + B \qquad \theta \in \mathbb{R}$$

where A and B are constants.

Given that the range of f is

$$-15 \leqslant f(x) \leqslant 33$$

(c) find the value of B and the possible values of A.

(4)

(Total for Question 7 is 11 marks)

8. Given that a is a positive constant,

(a) on **separate** diagrams, sketch the graph with equation

(i) $y = a - |x|$

(ii) $y = |3x - 2a|$

Show on each sketch the coordinates, in terms of a, of each point at which the graph crosses or meets the axes.

(4)

(b) Find, in terms of a, the values of x for which

$$a - |x| = |3x - 2a|$$

(4)

(Total for Question 8 is 8 marks)

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9. (a) Given that $-\frac{\pi}{2} < \mathrm{g}(x) < \frac{\pi}{2}$, sketch the graph of $y = \mathrm{g}(x)$ where

$$\mathrm{g}(x) = \arctan x \qquad x \in \mathbb{R}$$

(2)

(b) Find the exact value of x for which

$$3\mathrm{g}(x + 1) - \pi = 0$$

(2)

The equation $\arctan x - 4 + \frac{1}{2}x = 0$ has a positive root at $x = \alpha$ radians.

(c) Show that $5 < \alpha < 6$

(2)

The iteration formula

$$x_{n+1} = 8 - 2\arctan x_n$$

can be used to find an approximation for α

(d) Taking $x_0 = 5$, use this formula to find x_1 and α, giving each answer to 4 decimal places.

(3)

(Total for Question 9 is 9 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 19 January 2026

Morning (Time: 1 hour 30 minutes)

Paper reference **WMA13/01A**

Mathematics

International Advanced Level
Pure Mathematics P3
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 9 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

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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 6 marks)

Question 2

Write the answer to Question 2 on these 4 pages

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DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Question 2 continued

Question 2 continued

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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 10 marks)

Question 3

Write the answer to Question 3 on these 4 pages

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Question 3 continued

Question 3 continued

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Question 3 continued

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(Total for Question 3 is 10 marks)

Question 4

Write the answer to Question 4 on these 2 pages

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Question 4 continued

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(Total for Question 4 is 4 marks)

Question 5

Write the answer to Question 5 on these 2 pages

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Question 5 continued

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(Total for Question 5 is 8 marks)

Question 6

Write the answer to Question 6 on these 4 pages

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Question 6 continued

Question 6 continued

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Question 6 continued

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(Total for Question 6 is 9 marks)

Question 7

Write the answer to Question 7 on these 4 pages

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Question 7 continued

Question 7 continued

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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 11 marks)

Question 8

Write the answer to Question 8 on these 2 pages

Question 8 continued

This is the end of Question 8 answer space. Please turn the page for Question 9 answer space.

(Total for Question 8 is 8 marks)

Question 9

Write the answer to Question 9 on these 3 pages

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Question 9 continued

Question 9 continued

(Total for Question 9 is 9 marks)

TOTAL FOR PAPER IS 75 MARKS

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