

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

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Pearson Edexcel International Advanced Level

Time 1 hour 30 minutes

Paper

reference

WFM01/01

Mathematics

**International Advanced Subsidiary/Advanced Level
Further Pure Mathematics F1**

You must have:

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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$$\mathbf{A} = \begin{pmatrix} 3 & a \\ -2 & -2 \end{pmatrix}$$

(2)

(3)

Question 1 continued

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Q1

(Total 5 marks)



2.

$$f(x) = 7\sqrt{x} - \frac{1}{2}x^3 - \frac{5}{3x} \quad x > 0$$

- (a) Show that the equation $f(x) = 0$ has a root, α , in the interval $[2.8, 2.9]$ (2)
- (b) (i) Find $f'(x)$.
- (ii) Hence, using $x_0 = 2.8$ as a first approximation to α , apply the Newton-Raphson procedure once to $f(x)$ to calculate a second approximation to α , giving your answer to 3 decimal places. (4)
- (c) Use linear interpolation once on the interval $[2.8, 2.9]$ to find another approximation to α . Give your answer to 3 decimal places. (3)

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Question 2 continued

Handwriting practice area with 25 horizontal lines.

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Question 2 continued

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Question 2 continued

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Q2

(Total 9 marks)



Question 3 continued

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Question 3 continued

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Q3

(Total 9 marks)



Question 4 continued

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Question 4 continued

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Question 4 continued

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Q4

(Total 7 marks)



Question 5 continued

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Question 5 continued

Lined area for writing the answer to Question 5.



Question 5 continued

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Q5

(Total 8 marks)



- $$xy = a^2 \quad x > 0$$

(c) Hence show that the area of triangle AOB , where O is the origin, is independent of k (2)

Question 6 continued

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Question 6 continued

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Question 6 continued

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Q6

(Total 8 marks)



7. In part (i), the elements of each matrix should be expressed in exact numerical form.

- (i) (a) Write down the 2×2 matrix that represents a rotation of 210° anticlockwise about the origin.

(1)

- (b) Write down the 2×2 matrix that represents a stretch parallel to the y -axis with scale factor 5

(1)

The transformation T is a rotation of 210° anticlockwise about the origin followed by a stretch parallel to the y -axis with scale factor 5

- (c) Determine the 2×2 matrix that represents T

(2)

(ii)

$$\mathbf{M} = \begin{pmatrix} k & k+3 \\ -5 & 1-k \end{pmatrix} \quad \text{where } k \text{ is a constant}$$

- (a) Find $\det \mathbf{M}$, giving your answer in simplest form in terms of k .

(2)

A closed shape R is transformed to a closed shape R' by the transformation represented by the matrix $\mathbf{M}$.

Given that the area of R is 2 square units and that the area of R' is $16k$ square units,

- (b) determine the possible values of k .

(3)



Question 7 continued

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Question 7 continued

Lined area for writing the answer to Question 7.



Question 7 continued

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Q7

(Total 9 marks)



- The point P on C has coordinates $(5p^2, 10p)$ where p is a non-zero constant.

- The tangent to C at P meets the y -axis at the point A .

- The point S is the focus of C .

- The straight line l_1 passes through A and S .

The straight line l_j passes through O and P , where O is the origin.

Given that l_1 and l_2 intersect at the point B ,

- $$2x^2 + y^2 = 10x \quad (5)$$

Question 8 continued

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Question 8 continued

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Q8

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(Total 10 marks)



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- $$\text{is divisible by 11} \tag{5}$$

Question 9 continued

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Question 9 continued

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Question 9 continued

Lined area for writing the answer to Question 9.

Q9

(Total 10 marks)

TOTAL FOR PAPER: 75 MARKS

END

