

Write your name here

Surname

Other names

Pearson Edexcel
International
Advanced Level

Centre Number

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Candidate Number

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Further Pure Mathematics F1

Advanced/Advanced Subsidiary

Monday 23 June 2014 – Morning

Time: 1 hour 30 minutes

Paper Reference

WFM01/01

You must have:

Mathematical Formulae and Statistical Tables (Blue)

Total Marks

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. 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). Coloured pencils and highlighter pens must not be used.
- **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.
- When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information

- 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.

Turn over ►

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PEARSON

1. Find the value of

$$\sum_{r=1}^{200} (r+1)(r-1)$$

(4)



(Total 4 marks)

Q1

[illegible]

[illegible]

Question 2 continued

(Total 4 marks)

Q2



3.

$$\mathbf{A} = \begin{pmatrix} 4 & -2 \\ a & -3 \end{pmatrix}$$

where a is a real constant and $a \neq 6$

- (a) Find \mathbf{A}^{-1} in terms of a .

(3)

Given that $\mathbf{A} + 2\mathbf{A}^{-1} = \mathbf{I}$, where \mathbf{I} is the 2×2 identity matrix,

- (b) find the value of a .

(3)

[illegible]

Question 3 continued

(Total 6 marks)

Q3



4. $f(x) = x^{\frac{3}{2}} - 3x^{\frac{1}{2}} - 3, \quad x > 0$

Given that α is the only real root of the equation $f(x) = 0$,

- (a) show that $4 < \alpha < 5$ (2)
- (b) Taking 4.5 as a first approximation to α , apply the Newton-Raphson procedure once to $f(x)$ to find a second approximation to α , giving your answer to 3 decimal places. (5)
- (c) Use linear interpolation once on the interval $[4, 5]$ to find another approximation to α , giving 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.



[illegible]

Question 4 continued

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(Total 10 marks)





[illegible]

Question 5 continued



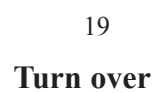
Q5



This image shows a full page of blank, lined paper. It features approximately 28 horizontal grey lines spaced evenly apart, typical of standard notebook paper. The lines extend across the entire width of the page, leaving small margins at the top and bottom. There are no vertical lines, text, or other markings present.

This image shows a full page of blank, lined paper. It features approximately 28 evenly spaced horizontal gray lines across its entire width, providing a template for handwriting practice or general note-taking. The background is a clean, solid white color.

(Total 8 marks)



7.

$$\mathbf{P} = \begin{pmatrix} \frac{\sqrt{3}}{2} & -\frac{1}{2} \\ \frac{1}{2} & \frac{\sqrt{3}}{2} \end{pmatrix}$$

- (a) Describe fully the single geometrical transformation U represented by the matrix \mathbf{P} . (3)

The transformation V , represented by the 2×2 matrix \mathbf{Q} , is a reflection in the x -axis.

- (b) Write down the matrix \mathbf{Q} . (1)

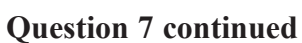
Given that V followed by U is the transformation T , which is represented by the matrix \mathbf{R} ,

- (c) find the matrix \mathbf{R} . (2)

- (d) Show that there is a real number k for which the transformation T maps the point $(1, k)$ onto itself. Give the exact value of k in its simplest form. (5)

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(Total 11 marks)



- Another point $B(8, 2)$ lies on the hyperbola H .

- (c) Find the coordinates of the points where this normal at B meets the parabola P . (6)

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[illegible]

Q8



Question 9 continued



[illegible]

Question 9 continued

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(Total 11 marks)

Q9

TOTAL FOR PAPER: 75 MARKS

END

