

Please check the examination details below before entering your candidate information

Candidate surname		Other names	
Pearson Edexcel		Centre Number	Candidate Number
International			
Advanced Level			
Time 1 hours 30 minutes	Paper reference	WFM03/01	
Mathematics International Advanced Subsidiary/Advanced Level Further Pure Mathematics F3			
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 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.
- Good luck with your examination.

Turn over ►



1. (a) Using the definitions of hyperbolic functions in terms of exponentials, show that

$$1 - \tanh^2 x \equiv \operatorname{sech}^2 x \quad (3)$$

- (b) Solve the equation

$$2 \operatorname{sech}^2 x + 3 \tanh x = 3$$

giving your answer as an exact logarithm. (3)

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Question 1 continued

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(Total 6 marks)

Q1



(4)

(3)

- (b) Using calculus, find the exact area of the surface generated.

Question 2 continued

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Question 2 continued

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Q2

(Total 7 marks)



$$\mathbf{M} = \begin{pmatrix} 3 & 1 & p \\ 1 & 1 & 2 \\ -1 & p & 2 \end{pmatrix} \text{ where } p \text{ is a real constant}$$

- (4)

(5)

Question 3 continued

Handwriting practice area with 30 horizontal lines.

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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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(Total 8 marks)

Q4



Question 5 continued

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Question 5 continued

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Q5

(Total 10 marks)



$$\mathbf{r} = \mathbf{i} + \mathbf{j} + \mathbf{k} + \lambda(\mathbf{i} + 3\mathbf{k})$$

$$\mathbf{r} = 2\mathbf{i} + s\mathbf{j} + \mu(\mathbf{i} - 2\mathbf{j} + \mathbf{k})$$

where s is a constant and λ and μ are scalar parameters.

Given that l_1 and l_2 both lie in a common plane Π_1

(a) show that an equation for Π_1 is $3x + y - z = 3$

(b) find the value of s . (1)

The plane Π_7 has equation $\mathbf{r} \cdot (\mathbf{i} + \mathbf{j} - 2\mathbf{k}) = 3$

(c) Find an equation for the line of intersection of Π_1 and Π_2

(d) Find the acute angle between Π_1 and Π_2 giving your answer in degrees to 3 significant figures.

Question 6 continued

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Question 6 continued

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Question 6 continued

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Lined area for writing the answer to Question 6.

(Total 13 marks)

Q6



$$(ii) \int_{\sqrt{3}}^3 \frac{\sqrt{x^2 - 3}}{x^2} dx \tag{5}$$

Question 7 continued

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Question 7 continued

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Question 7 continued

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Q7

(Total 8 marks)





Question 8 continued

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Question 8 continued

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11

END

TOTAL FOR PAPER: 75 MARKS