



Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2024

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--

Further Mathematics

Assessment Unit AS 1

assessing

Pure Mathematics

MV18

[SFM11]

MONDAY 13 MAY, AFTERNOON

Time

1 hour 30 minutes, plus your additional time allowance.

Instructions to Candidates

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer **all eight** questions in the spaces provided.

Do not write on blank pages.

Complete in black ink only.

Questions which require drawing or sketching should be completed using an HB pencil.

Show clearly the full development of your answers.

Answers without working may not gain full credit.

Answers should be given to three significant figures unless otherwise stated.

You are permitted to use a graphic or scientific calculator in this paper.

Information for Candidates

The total mark for this paper is 100

Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

A copy of the **Mathematical Formulae and Tables booklet** is provided.

Throughout the paper the logarithmic notation used is $\ln z$ where it is noted that $\ln z \equiv \log_e z$

2 The roots of the quadratic equation

$$3x^2 - 2x + 4 = 0$$

are α and β .

(i) Write down the values of $(\alpha + \beta)$ and $\alpha\beta$. [3 marks]

(ii) Find a quadratic equation with integer coefficients whose roots are

$$\frac{1}{\alpha^2} \text{ and } \frac{1}{\beta^2} \quad [6 \text{ marks}]$$

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

(i) Describe fully the single transformation represented by \mathbf{P} [3 marks]

(ii) Hence, or otherwise, find the maximum value of $|z|$ for the complex numbers z which satisfy

$$|z - (3 - 9i)| = \sqrt{10} \quad [4 \text{ marks}]$$

(ii) If $p = -1$ find, without the use of a calculator, the inverse of N [5 marks]

(iii) Calculate the acute angle between the line WZ and the plane WXY. [5 marks]

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	

Total Marks	
--------------------	--

Examiner Number

Permission to reproduce all copyright material has been applied for. In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA will be happy to rectify any omissions of acknowledgement in future if notified.