

ERUVIO MENTORING · EXTERNAL-STYLE EXAMINATION

Specialist Mathematics

Units 1 and 2 · Combinatorics, proof, vectors and matrices; complex numbers and trigonometry

Paper 1 · Section 1

MULTIPLE CHOICE · 10 MARKS

STUDENT DETAILS

GIVEN NAME(S)

FAMILY NAME

SCHOOL

DATE

BOOK OF

DO NOT WRITE ON THIS PAGE

Structure of this examination

PAPER	SECTION	QUESTION TYPE	TIME	MARKS
Paper 1 TECHNOLOGY-FREE	Section 1	Multiple choice, 10 questions	5 min perusal 90 min working	10
	Section 2	Short response, 9 questions		55
Paper 2 TECHNOLOGY-ACTIVE	Section 1	Multiple choice, 10 questions	5 min perusal 90 min working	10
	Section 2	Short response, 9 questions		55
Total		38 questions	190 minutes	130

Degree of difficulty

Every question in this examination is tagged with its degree of difficulty. The tag appears in brass beside the marks.

DEGREE OF DIFFICULTY	MARKS	PROPORTION
Simple familiar SF	78	60%
Complex familiar CF	26	20%
Complex unfamiliar CU	26	20%
Total	130	100%

Instructions

- **Perusal time: 5 minutes. Working time: 90 minutes.**
- **This is the technology-free paper.** Calculators, notes and the formula book may not be used.
- Write using black or blue pen. Planning paper will not be marked.
- All questions are drawn from Unit 1 (combinatorics, proof, vectors and matrices) and Unit 2 (complex numbers, trigonometry, functions and matrices).
- **Each question is tagged with its degree of difficulty** in brass beside the marks: **SF** simple familiar, **CF** complex familiar, **CU** complex unfamiliar.
- **Section 1 contains 10 multiple choice questions.** Choose the best answer for each and record it on the response grid provided.

Answers must be recorded on the response grid on the final page. Marks are not deducted for incorrect answers, so attempt every question.

- 1 The value of 8C_3 is
 - A 24
 - B 40
 - C 56
 - D 336
- 2 The magnitude of the vector $3\mathbf{i} - 4\mathbf{j}$ is
 - A 5
 - B 7
 - C 12
 - D 25
- 3 The product $(2 + 3i)(1 - i)$ equals
 - A $-1 + 5i$
 - B $5 - i$
 - C $2 - 3i$
 - D $5 + i$
- 4 The determinant of $\begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix}$ is
 - A 6
 - B 10
 - C 12
 - D 14
- 5 The contrapositive of the statement "if n^2 is even then n is even" is
 - A if n is even then n^2 is even.
 - B if n^2 is odd then n is even.
 - C if n is odd then n^2 is odd.
 - D if n is not even then n^2 is even.
- 6 If $\mathbf{a} = 2\mathbf{i} + 3\mathbf{j}$ and $\mathbf{b} = 4\mathbf{i} - \mathbf{j}$, then $\mathbf{a} \cdot \mathbf{b}$ equals
 - A 5
 - B 8
 - C 11
 - D 14

- 7 The modulus of the complex number $3 - 4i$ is
- A 1
 - B 5
 - C 7
 - D 25
- 8 The exact value of $\tan(5\pi/4)$ is
- A $-\sqrt{3}$
 - B -1
 - C $\sqrt{3}/3$
 - D 1
- 9 The matrix $\begin{bmatrix} k & 2 \\ 3 & 6 \end{bmatrix}$ has no inverse when $k =$
- A -1
 - B 0
 - C 1
 - D 3
- 10 A committee of 4 is to be chosen from 6 men and 5 women. The number of committees containing at least 3 women is
- A 65
 - B 75
 - C 120
 - D 330

Response grid

Shade or cross the box for your chosen answer

Question	A	B	C	D
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

END OF SECTION 1