

ERUVIO MENTORING · EXTERNAL-STYLE EXAMINATION

Mathematical Methods

Units 1 and 2 · Algebra, statistics and functions; calculus and further functions

Paper 2 · 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	10
	Section 2	Short response, 9 questions	90 min working	45
Paper 2 TECHNOLOGY-ACTIVE	Section 1	Multiple choice, 10 questions	5 min perusal	10
	Section 2	Short response, 9 questions	90 min working	45
Total		38 questions	190 minutes	110

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	66	60%
Complex familiar CF	22	20%
Complex unfamiliar CU	22	20%
Total	110	100%

Instructions

- **Perusal time: 5 minutes. Working time: 90 minutes.**
- **This is the technology-active paper.** A QCAA-approved graphics calculator or CAS may be used, and the QCAA formula book is provided.
- Write using black or blue pen. Planning paper will not be marked.
- All questions are drawn from Unit 1 (algebra, statistics and functions) and Unit 2 (calculus and further functions).
- **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.

Paper 2 · Section I

Multiple choice · 10 questions · 10 marks · technology-active

- 1 Correct to two decimal places, the solution of $2^x = 50$ is $x =$
- A 3.91
B 5.64
C 25.00
D 50.00
- 2 \$5000 is invested at 4.5% per annum, compounded annually. The least number of whole years before the investment is worth more than \$10 000 is
- A 13
B 14
C 15
D 16
- 3 A discrete random variable X takes the values 1, 2, 3 and 4 with probabilities 0.4, 0.3, 0.2 and 0.1 respectively. The expected value of X is
- A 2.0
B 2.5
C 3.0
D 4.0
- 4 If $f(x) = xe^{-x}$, then correct to three decimal places $f'(2) =$
- A -0.406
B -0.271
C -0.135
D 0.135
- 5 The number of solutions of $3 \sin(2x) = 1$ for $0 \leq x \leq 2\pi$ is
- A 2
B 4
C 6
D 8
- 6 Which expression gives the number of different committees of 3 people that can be chosen from a group of 9 people?
- A 9×3
B $9!/6!$
C 9^3
D $9!/(3! 6!)$

- 7 For two events A and B , $P(A \text{ and } B) = 0.12$ and $P(B) = 0.40$. The value of $P(A \mid B)$ is
- A 0.30
 - B 0.40
 - C 0.48
 - D 0.75
- 8 A particle moves in a straight line so that its displacement, in metres, after t seconds is $s = t^3 - 3t^2$. The acceleration of the particle at $t = 4$ is
- A 6 m s^{-2}
 - B 12 m s^{-2}
 - C 18 m s^{-2}
 - D 24 m s^{-2}
- 9 A quantity decays according to $A = 100(0.85)^t$. Correct to two decimal places, the value of t for which the quantity has halved is
- A 2.13
 - B 4.27
 - C 8.53
 - D 15.00
- 10 The graph of $y = f(x)$ is transformed to the graph of $y = 2f(x - 3)$. The transformation is
- A a dilation of factor 2 from the x axis and a translation of 3 units left.
 - B a dilation of factor 3 from the y axis and a translation of 2 units right.
 - C a translation of 3 units right and a dilation of factor $\frac{1}{2}$ from the x axis.
 - D a dilation of factor 2 from the x axis and a translation of 3 units right.

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