

ERUVIO MENTORING · EXTERNAL-STYLE EXAMINATION

Mathematical Methods

Units 3 and 4 · Further calculus; further functions and statistics

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 90 min working	10
	Section 2	Short response, 9 questions		45
Paper 2 TECHNOLOGY-ACTIVE	Section 1	Multiple choice, 10 questions	5 min perusal 90 min working	10
	Section 2	Short response, 9 questions		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 3 (further calculus) and Unit 4 (further functions and statistics).
- **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 1

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

- 1 A random variable X is normally distributed with mean 50 and standard deviation 8. Correct to four decimal places, $P(X < 60) =$
 - A 0.1056
 - B 0.3944
 - C 0.7888
 - D 0.8944
- 2 A random variable X follows a binomial distribution with $n = 10$ and $p = 0.4$. Correct to four decimal places, $P(X = 4) =$
 - A 0.2508
 - B 0.3333
 - C 0.4000
 - D 0.6331
- 3 In a sample of 200 people, 60% support a proposal. Correct to four decimal places, the margin of error for a 95% confidence interval for the population proportion is
 - A 0.0035
 - B 0.0346
 - C 0.0679
 - D 0.1358
- 4 Correct to four decimal places, $\int_1^4 1/x \, dx =$
 - A 0.7500
 - B 1.3863
 - C 2.0794
 - D 4.0000
- 5 For $x > 0$, the minimum value of $x + 4/x$ is
 - A 1
 - B 2
 - C 3
 - D 4

- 6 A sinusoidal function has amplitude 4, period π , and oscillates about the line $y = 2$. It can be written as $y = a \sin(bx) + d$ where
- A $a = 4, b = 2, d = 2$
 - B $a = 2, b = 4, d = 2$
 - C $a = 4, b = \pi/2, d = 2$
 - D $a = 8, b = 2, d = 2$
- 7 A random variable follows a binomial distribution with $n = 50$ and $p = 0.2$. Correct to two decimal places, its standard deviation is
- A 2.00
 - B 2.83
 - C 8.00
 - D 10.00
- 8 The area of the region enclosed between $y = 2x$ and $y = x^2$ is
- A 0.667
 - B 1.000
 - C 1.333
 - D 2.667
- 9 The volume of liquid in a tank, in litres, after t minutes is $V = 100 - 5t^2$. The rate at which the liquid is leaving the tank when $t = 3$ is
- A 5 L min^{-1}
 - B 10 L min^{-1}
 - C 15 L min^{-1}
 - D 30 L min^{-1}
- 10 A pollster wants a 95% confidence interval for a population proportion to have a margin of error no greater than 0.03. Using the most conservative estimate of the proportion, the smallest sample size required is
- A 544
 - B 1068
 - C 1503
 - D 2135

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