EXAM PAPER

Mathematical Methods Unit 3 & 4 — Examination 1 (Practice 5)

PREVIEW
This file has the first 5 of the 9 questions in this paper. The rest is locked: it comes with a PrepNest plan, or with the paper itself for VCE.

Reading time: 15 minutes (no writing)
Writing time: 60 minutes
Total time: 75 minutes

SECTIONS IN THIS PAPER

- Examination 1 — technology-free — 60 min (no calculator)

INSTRUCTIONS

You are not permitted to write during reading time — you may only read the paper and plan your approach. Answer every question you can. Write your working in the space provided for long-answer questions. Marking guidance and full explanations are provided in the separate answer key.

Examination 1 — technology-free

60 minutes • No calculator

Question 1

(4 marks)

Let f: R → R, f(x) = x/(x² + 1).

a. Use the quotient rule to show that f′(x) = (1 − x²)/(x² + 1)². 2 marks

b. Find the coordinates and nature of the stationary points of the graph of f. 2 marks

Question 2

(4 marks)

This question is about antiderivatives of circular, reciprocal and logarithmic functions.

a. Find ∫(sin(2x) + 1/(2x + 1)) dx, where x > −1/2. 2 marks

b. Evaluate ∫ cos(3x) dx from x = 0 to x = π/6. 1 mark

c. Given that d/dx(xlog$_e$(x)) = log$_e$(x) + 1, find an antiderivative of log$_e$(x). 1 mark

Question 3

(5 marks)

Let f: R \ {1} → R, f(x) = 3/(x − 1)² − 1.

a. Write down the equations of the asymptotes of the graph of f. 1 mark

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b. Find the coordinates of the points where the graph of f meets the axes. 3 marks

c. State the range of f. 1 mark

Question 4

(5 marks)

Let h: R → R, h(x) = 3sin(πx/2) + 1.

a. State the period and the range of h. 2 marks

b. Solve h(x) = 5/2 for x ∈ [0, 4]. 2 marks

c. Find the number of solutions of h(x) = 1 for x ∈ [0, 8]. 1 mark

Question 5

(4 marks)

This question is about equations involving indices and logarithms.

a. Solve $2^{2x} - 3 \times 2^{x+1} + 8 = 0$ for x. 2 marks

b. Solve $\log_e(x) + \log_e(x - 3) = \log_e(4)$ for x. 2 marks

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6.

7.

8.

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9.

4 questions locked, up to question 9.

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PREVIEW

That’s the end of the preview

You’ve seen the first 5 of the 9 questions in Mathematical Methods Unit 3 & 4 — Examination 1 (Practice 5). The full paper is worth 40 marks.

STILL TO COME	QUESTIONS	MARKS
Examination 1 — technology-free	4	18

The full paper comes with

- Every question, printed exactly like the ones in this preview
- The complete answer key, with the working behind every mark
- A topic report after marking, showing what to practice next

Get the full paper at

prepnest.com.au/practice/exams/maths_methods-year_12-5-exam1

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