EXAM PAPER

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

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.

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Examination 1 — technology-free

60 minutes • No calculator

Question 1

(4 marks)

This question is about the derivatives of logarithmic and circular functions.

a. Let $y = \log_e(3x^2 + 1)$. Find dy/dx. 1 mark

b. Let $f(x) = x \tan(x)$. Evaluate $f'(\pi/4)$. 3 marks

Question 2

(4 marks)

This question is about antiderivatives of exponential and circular functions.

a. Find $\int(e^{-2x} + \sin(3x))\,dx$. 2 marks

b. Evaluate $\int(e^x + e^{-x})\,dx$ from $x = 0$ to $x = \log_e(2)$. 2 marks

Question 3

(4 marks)

Let $f: R \to R$ be defined by
$f(x) = x^2 + a$ for $x < 1$, and $f(x) = bx + 1$ for $x \geq 1$,
where a and b are real constants.

a. Show that if f is continuous at $x = 1$, then $a = b$. 1 mark

b. Given that f is also differentiable at $x = 1$, find the values of a and b. 2 marks

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c. Using these values, state the range of f. 1 mark

Question 4 (5 marks)

For events A and B, $Pr(A) = 0.5$, $Pr(B) = 0.3$ and $Pr(A \cup B) = 0.6$.

a. Find $Pr(A \cap B)$. 1 mark

b. Find $Pr(A \mid B)$. 1 mark

c. Determine whether A and B are independent. Give a reason for your answer. 1 mark

d. Find $Pr(A \cap B' \mid A \cup B)$. 2 marks

Question 5 (4 marks)

This question is about exponential and logarithmic equations.

a. Solve $\log_2(x + 3) - \log_2(x - 1) = 2$ for x. 2 marks

b. Solve $2^{x+1} = 3^x$ for x, giving your answer in the form $\log_e(p)/\log_e(q)$, where p and q are rational numbers. 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 3). The full paper is worth 40 marks.

STILL TO COME	QUESTIONS	MARKS
Examination 1 — technology-free	4	19

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_12-3-exam1

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