



**Test Papers
Hub.**

QCAA Mathematical Methods Practice Paper 1

Units 3 & 4 — External Assessment Practice

Paper 1 (technology-free) and Paper 2 (technology-active) · each: 10 multiple-choice + short response · 55 marks each · 110 marks in all

How to use this booklet

- This booklet contains BOTH practice papers for a complete QCAA external-assessment sitting. Paper 1 is technology-free (perusal 5 minutes, working 90 minutes); Paper 2 is technology-active (perusal 5 minutes, working 90 minutes, QCAA-approved calculator permitted).
- Each paper has Section 1 (10 multiple choice, 10 marks) and Section 2 (short response, 45 marks). Show all reasoning and working for questions worth more than one mark.
- A formula book is assumed to be provided. Worked solutions, with a key takeaway for every question, follow the papers.

PAPER 1 — TECHNOLOGY-FREE — SECTION 1 (MULTIPLE CHOICE)

10 marks · perusal 5 minutes, working 90 minutes (whole paper)

Choose the best answer for each question. Calculators are NOT permitted.

1. The value of $2\log_3(27) - \log_3(3)$ is

- A 5
- B 243
- C 7
- D 2

2. The exact value of $\sin(\frac{11\pi}{6})$ is

- A $-\frac{\sqrt{3}}{2}$
- B $\frac{1}{2}$
- C $-\frac{1}{2}$
- D $\frac{\sqrt{3}}{2}$

3. $f(x) = 3x + 5$ and $g(x) = x^2 - 1$. The value of $f(g(4))$ is

- A 288
- B 50
- C 255
- D 32

4. The value of $\int$ from 0 to 2 of $(4x^2 + 2x + 3) dx$ is

- A $\frac{62}{3}$
- B $\frac{65}{3}$
- C 54
- D 20

5. The maximal domain of $f(x) = \sqrt{3 - 1x}$ is

- A $x \leq 3$
- B $x \leq -3$
- C $x \geq 3$
- D $x < 3$

6. $f(x) = e^{(4x)} + 5$. The value of $f^{-1}(11)$ is

- A $-5 + \frac{\ln(11)}{4}$
- B $5 + e^{44}$
- C $\ln(6)$
- D $\frac{\ln(6)}{4}$

7. The gradient of the curve $y = 3\sin(2x + 4)$ at $x = 2$ is

- A $12\cos(8)$
- B $6\cos(8)$
- C $3\cos(8)$
- D $-6\cos(8)$

8. The graph of $y = x^3 + \frac{9x^2}{2} - 12x$ has a local maximum at $x = a$ and a local minimum at $x = b$. The value of $b - a$ is

- A -4
- B 5
- C -3
- D 6

9. The period of the function $f(x) = 2\sin(3x + 4) + 2$ is

- A 6π
- B π
- C $\frac{\pi}{3}$
- D $\frac{2\pi}{3}$

10. The point $(0, -3)$ lies on the graph of $y = f(x)$. The graph is transformed to $y = -4f(x - 3) + 2$. The image of the point is

- A $(-3, 14)$
- B $(3, -10)$
- C $(3, 14)$
- D $(3, 4)$

WORKED SOLUTIONS

Answers & worked solutions

Multiple-choice answer key

P1-1 A	P1-2 C	P1-3 B	P1-4 A	P1-5 A	P1-6 D
P1-7 B	P1-8 B	P1-9 D	P1-10 C	P2-1 C	P2-2 A
P2-3 B	P2-4 A	P2-5 D	P2-6 B	P2-7 D	P2-8 A
P2-9 B	P2-10 C				

PAPER 1 — TECHNOLOGY-FREE — SECTION 1 (MULTIPLE CHOICE)

1. The value of $2\log_3(27) - \log_3(3)$ is [Logarithm laws]

Correct answer: A — 5

- $\log_3(27) = 3$ and $\log_3(3) = 1$.
- $2(3) - 1 = 5$.
- Why the other options are wrong:
- B (243): That is the number whose log is the answer; the answer is the log value itself.
- C (7): Subtract the second logarithm.
- D (2): The coefficient 2 multiplies $\log_3(27) = 3$.

LOS: Methods: multiple choice

KEY TAKEAWAY

Evaluate each logarithm as a power of the base, then combine.

2. The exact value of $\sin(\frac{11\pi}{6})$ is [Exact trig values]

Correct answer: C — $-\frac{1}{2}$

- Find the reference angle and the quadrant of $\frac{11\pi}{6}$.
- Use the sign for sin in that quadrant: $-\frac{1}{2}$.
- Why the other options are wrong:
- A ($-\frac{\sqrt{3}}{2}$): This is the value for a different reference angle.
- B ($\frac{1}{2}$): Check the sign in this quadrant (ASTC).
- D ($\frac{\sqrt{3}}{2}$): This is the value for a different reference angle.

LOS: Methods: multiple choice

KEY TAKEAWAY

Reference angle for the size, ASTC (All, Sine, Tan, Cos) for the sign.