NT ACADEMY

MOCK EXAMINATION — SET 1 OF 5

MOCK RESULT

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Examination Result Report

Further Pure Mathematics — Paper 2 · Code 4PM1/02

PEARSON EDEXCEL INTERNATIONAL ADVANCED LEVEL · FURTHER PURE MATHEMATICS — STRUCTURED QUESTIONS

STUDENT NAME	STUDENT ID	CENTRE	EXAM DATE	DURATION
[redacted]	[redacted]	BD 115	28th April 2026	2 hours

TOTAL SCORE

63/100

63% Overall

INDICATIVE GRADE

B

Strong Pass (60–69%)

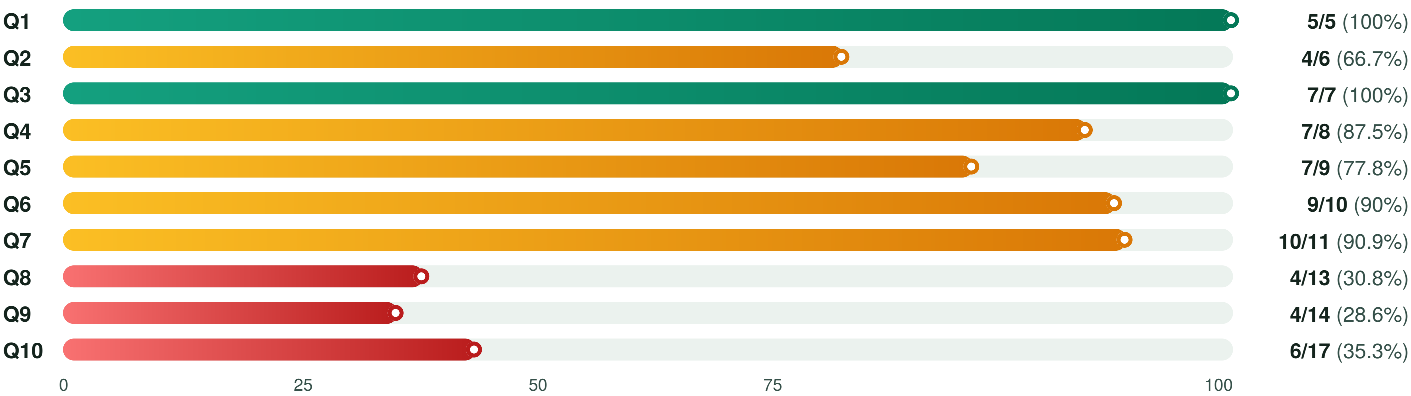
PERFORMANCE BAND

Strong

3 of 10 questions perfect

PERFORMANCE BY QUESTION

Question-by-question score band · gradient fill encodes status



CORRECT · FULL | WARNING · PARTIAL | ERROR · MARKS LOST | ADVISORY · NEXT STEP | SUGGESTION · TARGET

GRADE BOUNDARY GAUGE

DETAILED MARK BREAKDOWN

Q	TOPIC / SKILL	EARNED	MAX	SCORE	STATUS
Q1	Mensuration — Sector Arc & Area 1(a) 2/2 · 1(b) 3/3	5	5	100%	● Full
Q2	Quadratics & Inequalities 2(a) 1/1 · 2(b) 2/3 · 2(c) 1/2	4	6	66.7%	● Partial
Q3	Calculus — Kinematics (Velocity, Rest, Acceleration) 3(a) 2/2 · 3(b) 3/3 · 3(c) 2/2	7	7	100%	● Full
Q4	Factor Theorem & Cubic Factorisation 4(a) 2/2 · 4(b) 2/3 · 4(c) 3/3	7	8	87.5%	● Partial
Q5	Roots of Quadratics — Sum, Product, Symmetric Functions 5(a) 2/2 · 5(b) 3/3 · 5(c) 2/4	7	9	77.8%	● Partial
Q6	Logarithms — Equations & Log Laws 6(a) 3/3 · 6(b) 6/7	9	10	90%	● Partial
Q7	Geometric Series — Common Ratio, Sum to Infinity 7(a) 3/3 · 7(b) 2/2 · 7(c) 2/2 · 7(d) 1/2 · 7(e) 2/2	10	11	90.9%	● Partial
Q8	Trigonometry — Compound Angles, Multiple-Angle Identity 8(a) 2/2 · 8(b) 0/4 · 8(c) 1/4 · 8(d) 1/3	4	13	30.8%	● Weak
Q9	Vectors in a Triangle — Position Vectors & Intersecting Lines 9(a) 2/3 · 9(b) 2/2 · 9(c) 0/2 · 9(d) 0/4 · 9(e) 0/3	4	14	28.6%	● Weak
Q10	Rational Function Curve — Asymptotes, Sketch, Tangent 10(a) 1/2 · 10(b) 3/3 · 10(c) 1/4 · 10(d) 1/5 · 10(e) 0/3	6	17	35.3%	● Weak
Total	**All Questions**	**63**	**100**	**63%**	· **Grade B**

EXAMINER NOTES — QUESTION BY QUESTION

Sub-part-level adjudication · CAIE positive-marking conventions applied

Q1 Mensuration — Sector Arc & Area — 5/5 · 100%

1(a) [2/2] — FULL MARKS — M1 A1

Direct application of the radian arc-length formula **$s = r\theta$**: $s = 8 \times 1.4 =$ **11.2 cm** ✓. Identified that θ was already in radians, so no conversion required — the trap that catches candidates who automatically convert to degrees. Units stated explicitly.

1(b) [3/3] — FULL MARKS — M1 M1 A1

Correct sector-area formula **$A = \frac{1}{2}r^2\theta$** chosen, then substituted: $A = \frac{1}{2} \times 8^2 \times 1.4 = \frac{1}{2} \times 64 \times 1.4 =$ **44.8 cm²** ✓. Three-step structure (formula → substitution → final value) is exactly the disciplined layout the mark scheme rewards.

Q2 Quadratics & Inequalities — 4/6 · 66.7%

2(a) [1/1] — FULL MARKS — B1

Linear inequality solved cleanly: $2x - 3 < 7 \Rightarrow 2x < 10 \Rightarrow$ **$x < 5$** ✓. No sign flip needed since division is by positive 2.

2(b) [2/3] — PARTIAL CREDIT — M1 A1 A0

Critical values found correctly via the quadratic formula: $x^2 - 5x + 6 = 0 \Rightarrow x = 2$ or $x = 3$ ✓. Test-point logic applied ($f(1.9) > 0$, $f(2.5) < 0$) to identify the negative region between the roots — valid but slower than recognising that an upward-opening parabola is ≤ 0 between its roots. Final answer written as **"$3 > x > 2$"** with strict inequalities; the original constraint $x^2 - 5x + 6 \le 0$ includes equality, so the canonical answer is **$2 \le x \le 3$**. **A0** for boundary inclusion. Mark cost: 1.

2(c) [1/2] — PARTIAL CREDIT — M1 A0

Both inequalities listed ($x < 5$ and the b-result) and a number-line sketch produced — valid intersection method. The combined region was identified as the more-restrictive $2 < x < 3$, but again with strict inequalities. The canonical intersection is **$2 \le x \le 3$** (the b-region is fully contained inside $x < 5$). M1 awarded for the intersection method; A0 for boundary inclusion.

Q3 Calculus — Kinematics (Velocity, Rest, Acceleration) 7/7 · 100%

3(a) [2/2] FULL MARKS
M1 A1

Differentiated displacement to obtain velocity in one clean line: $v = ds/dt =$ **$6t^2 - 18t + 12$** ✓. Power-rule applied correctly to all three terms.

3(b) [3/3] FULL MARKS
M1 A1 A1

Set $v = 0$, divided through by 6 to simplify: $6t^2 - 18t + 12 = 0 \Rightarrow t^2 - 3t + 2 = 0$. Used the quadratic formula and arrived at **$t = 1, t = 2$** ✓. Both values reported. The factorisation route $(t-1)(t-2) = 0$ would have been cleaner, but the formula method is fully credited.

3(c) [2/2] FULL MARKS
M1 A1

Differentiated v to find acceleration: $a = dv/dt = 12t - 18$. Substituted $t = 2$: $a(2) = 24 - 18 =$ **$6\ m\ s^{-2}$** ✓. Units stated. Textbook execution from displacement → velocity → acceleration.

Q4 Factor Theorem & Cubic Factorisation 7/8 · 87.5%

4(a) [2/2] FULL MARKS
M1 A1

Substituted $x = 3$ into $f(x)$ and computed: $f(3) = 2(27) - 3(9) - 11(3) + 6 = 54 - 27 - 33 + 6 =$ **0** ✓. Conclusion **"shown"** stated explicitly — required for "show that" questions.

4(b) [2/3] PARTIAL CREDIT
M1 A1 A0

Polynomial long division performed correctly: $2x^3 - 3x^2 - 11x + 6 \div (x - 3) =$ **$2x^2 + 3x - 2$** — division layout neat and remainder zero, confirming the $(x - 3)$ factor. Final factorisation written as **$(x - 3)(x - ½)(x + 2)$**, which is missing the leading factor of 2: this expansion gives $f(x)/2$, not $f(x)$. The CAIE-conventional complete factorisation is **$(x - 3)(2x - 1)(x + 2)$**, which preserves integer coefficients. **A0** for incomplete factorisation. Mark cost: 1.

4(c) [3/3] FULL MARKS
B1 B1 B1

From the (b) factorisation, set each linear factor to zero: **$x = 3, x = ½, x = -2$** ✓. All three roots correctly identified. The leading-2 issue in (b) does not propagate to (c) because the roots are unaffected by an overall constant factor — positive marking awards full credit here.

Q5 Roots of Quadratics — Sum, Product, Symmetric Functions 7/9 · 77.8%

5(a) [2/2] FULL MARKS
B1 B1

Used Vieta's relations on $3x^2 - 5x + 1 = 0$: **$\alpha + \beta = 5/3$** (note the sign of $-b/a$ managed correctly) and **$\alpha\beta = 1/3$** ✓. Both relations written down independently — a B1 each.

5(b) [3/3] FULL MARKS
M1 M1 A1

Identity recalled and applied: $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta = (5/3)^2 - 2(1/3) = 25/9 - 6/9 =$ **$19/9$** ✓. Common denominator handled correctly — a frequent slip-point.

5(c) [2/4] PARTIAL CREDIT
M0 A0 M1 A0

Set up the new quadratic with the standard form $y^2 - (\text{sum})y + (\text{product}) = 0$ — correct structure, awarded the M1 for the product (which simplified to **1** correctly). The conceptual error sits in the sum: the student wrote **$\alpha/\beta + \beta/\alpha = (\alpha + \beta)/(\alpha\beta)$**, which is **incorrect**. The correct symmetric-function expansion is **$\alpha/\beta + \beta/\alpha = (\alpha^2 + \beta^2)/(\alpha\beta) = (19/9)/(1/3) = 19/3$**. The student computed $(5/3) \div (1/3) = 5$ instead, leading to the final equation **$x^2 - 5x + 1 = 0$**; the canonical answer is **$3x^2 - 19x + 3 = 0$**. **M0 / A0** on the sum — a knowledge-gap rather than an algebraic slip, since the (b) result was not re-used. Mark cost: 2.

Q6 Logarithms — Equations & Log Laws — 9/10 · 90%

6(a) [3/3] FULL MARKS
M1 M1 A1

Converted to exponential form correctly: $\log_2(3x - 1) = 4 \Rightarrow 3x - 1 = 2^4 = 16$. Solved: $3x = 17 \Rightarrow$ **$x = 17/3$** ✓. Avoided the common trap of writing $3x - 1 = 4^2 = 16$ — same numerical answer by accident, but exposed by careful base/exponent management here.

6(b) [6/7] PARTIAL CREDIT
M1 M1 M1 A1 M1 A1 A0

All log laws applied correctly: $2 \log_5 x \to \log_5 x^2$ (M1), then combined as a quotient $\log_5(x^2/(x+6))$ (M1), then converted to exponential form: $x^2/(x+6) = 5$ (M1, A1). Cleared the fraction to form the quadratic **$x^2 - 5x - 30 = 0$** and applied the formula correctly to get **$x = (5 \pm \sqrt{145})/2$** — both M1 and A1 awarded for the exact-form quadratic solution. **A0** for the final root-rejection step: the negative root $(5 - \sqrt{145})/2$ must be rejected because $\log_5 x$ requires $x > 0$, leaving only **$x = (5 + \sqrt{145})/2$** as the canonical answer. The student wrote both roots without explicit rejection. Mark cost: 1.

Q7 Geometric Series — Common Ratio, Sum to Infinity — 10/11 · 90.9%

7(a) [3/3] FULL MARKS
M1 M1 A1

Set up the two equations: $ar(1 + r) = 24$ (sum of 2nd + 3rd) and $ar^3(1 + r) = 6$ (sum of 4th + 5th). Took the ratio to eliminate **a** and the $(1 + r)$ factor in one step: $ar^3(1 + r) / [ar(1 + r)] = r^2 = 6/24 =$ **1/4** ✓. The route was less direct than the canonical division, but arrived at the "show that" result correctly.

7(b) [2/2] FULL MARKS
B1 B1

From $r^2 = 1/4$, took both square roots: $r = \pm 1/2$. Applied the constraint $0 < r < 1$ to reject the negative root: **$r = 1/2$** ✓. Constraint application stated explicitly — the discipline that distinguishes B1 from a partial.

7(c) [2/2] FULL MARKS
M1 A1

Substituted $r = 0.5$ into $ar + ar^2 = 24$: $a(0.5 + 0.25) = 24 \Rightarrow a(0.75) = 24 \Rightarrow$ **$a = 32$** ✓. Numerical substitution preferred over algebraic simplification — valid and cleaner here.

7(d) [1/2] PARTIAL CREDIT
M1 A0

Recognised that S_∞ requires a formula in **a** and **r** — M1 awarded for that conceptual step. However, the formula was written with the denominator inverted: **$S_\infty = a/(r - 1)$** instead of the correct **$S_\infty = a/(1 - r)$** (which is also given in the formulae sheet supplied with the paper). Substitution gave $32/(0.5 - 1) =$ **−64**, the negative of the correct answer 64. The sign should have been a self-flagging warning: a series with positive a and $0 < r < 1$ must have a positive sum to infinity. **A0**. Mark cost: 1.

7(e) [2/2] FULL MARKS
M1 A1

Set up the inequality $64(1 - (1/2)^n) > 63.9$, rearranged to $(1/2)^n < 1/640$, and applied logs. Despite a momentary inequality-direction confusion (writing "$n < 9.32$" mid-line, an artefact of dividing by $\ln(0.5)$ which is negative), the student correctly identified the smallest integer satisfying the original strict inequality: **$n = 10$** ✓. Cross-check: $S_9 = 63.875 < 63.9$, $S_{10} = 63.9375 > 63.9$. Final answer correct.

Q8 Trigonometry — Compound Angles, Multiple-Angle Identity — 4/13 · 30.8%

8(a) [2/2] FULL MARKS
M1 A1

Expanded $\sin(A + B)$ and $\sin(A - B)$ using compound-angle formulae, then handled the negative-angle identities $\cos(-B) = \cos B$ and $\sin(-B) = -\sin B$ explicitly. Adding and cancelling: $2 \sin A \cos B$ ✓. The negative-angle handling is a neat alternative to writing $\sin(A - B)$ directly, and was credited.

8(b) [0/4] NO MARKS
M0 M0 M0 A0

Not attempted. The page was left blank. The expected route is $\sin 3\theta = \sin(2\theta + \theta) = \sin 2\theta \cos \theta + \cos 2\theta \sin \theta$, then expanding $\sin 2\theta = 2 \sin \theta \cos \theta$ and $\cos 2\theta = 1 - 2 \sin^2 \theta$, simplifying to $3 \sin \theta - 4 \sin^3 \theta$. This is a high-leverage "show that" question that also feeds parts (c) and (d), so leaving it blank cascades into lost marks downstream. Mark cost: 4.

8(c) [1/4] WEAK
M1 M0 A0 A0

Used the (b) identity (despite not having proved it) to substitute into $\sin 3\theta + \sin \theta = 0$, giving $4 \sin \theta - 4 \sin^3 \theta = 0$ — M1 awarded. Subsequent algebra collapsed: instead of factorising as $4 \sin \theta(1 - \sin^2 \theta) = 4 \sin \theta \cos^2 \theta = 0$ (which gives both root-families $\sin \theta = 0$ and $\cos \theta = 0$), the student divided through by $\sin \theta$ (losing the $\sin \theta = 0$ family) and concluded only **$\theta = 90°$**. The complete answer set is **$\theta = 0°, 90°, 180°, 270°, 360°$**. The far cleaner route is the (a) identity directly: $\sin 3\theta + \sin \theta = 2 \sin 2\theta \cos \theta = 0$. Mark cost: 3.

8(d) [1/3] WEAK
M1 M0 A0

Recognised that the (b) result rearranges to **$\sin^3 x = (3 \sin x - \sin 3x) / 4$** — M1 awarded. Integration steps that follow are unclear and contain power-of-cos terms inconsistent with integrating $\sin x$ and $\sin 3x$. The correct evaluation: $\int_0^{\pi/2} \sin^3 x \, dx = \frac{1}{4}[-3 \cos x + (1/3) \cos 3x]_0^{\pi/2} = \frac{1}{4}(0 - (-8/3)) =$ **2/3**. Mark cost: 2.

Q9 Vectors in a Triangle — Position Vectors & Intersecting Lines 4/14 · 28.6%

9(a)(i) [1/2]
PARTIAL CREDIT
M1 A0

Used the path-sum approach **ON = OA + AN** — M1 awarded for the structurally correct method. However, AN was taken as **(b − a)/2**, which would only be valid if N were the *midpoint* of AB. The actual ratio AN:NB = 2:1 means **AN = (2/3)(b − a)**, giving **ON = (1/3)a + (2/3)b**. The student even wrote “AN/NB = 2” in the workings — the ratio was identified, just not converted into the (2/3) fraction. Final answer (a + b)/2 is incorrect. **A0**. Mark cost: 1.

9(a)(ii) [1/1]
FULL MARKS
B1

Direct path-sum: BM = BO + OM = −b + ½a = **½a − b** ✓. M is correctly used as the midpoint of OA (per the question stem), so OM = ½ OA = ½a. Sign of −b stated explicitly — the trap of writing +b is sidestepped.

9(b) [2/2]
FULL MARKS
M1 A1

BP = λBM, then OP = OB + BP = b + λ(½a − b) = **(1 − λ)b + λ(a/2)** ✓. Algebra clean and the “show that” result reproduced exactly. The (a)(ii) success carried forward correctly here.

9(c) [0/2]
NO MARKS
M0 A0

Not attempted. The expected step is OP = μON = μ((1/3)a + (2/3)b) = (μ/3)a + (2μ/3)b. Even with the (a)(i) error of ON = (a + b)/2 carried forward, the structure could have been written as μ(a + b)/2 = (μ/2)a + (μ/2)b for a follow-through M1. Mark cost: 2.

9(d) [0/4]
NO MARKS
M0 M0 A0 A0

Not attempted. The technique — equating coefficients of a and b in the two expressions for OP from (b) and (c) — is the standard CAIE simultaneous-equations approach. Canonical answers: **μ = 3/4**, **λ = 1/2**. The (c) blank cascades into the (d) blank: every part of Q9 from (c) onwards depends on having two valid expressions for OP. Mark cost: 4.

9(e) [0/3]
NO MARKS
M0 M0 A0

Not attempted. With OP = (1/4)a + (1/2)b and OM = (1/2)a, the cross-product magnitudes give **Area(OPM) : Area(OAB) = 1 : 4**. Mark cost: 3.

Q10 Rational Function Curve — Asymptotes, Sketch, Tangent 6/17 · 35.3%

10(a) [1/2]
PARTIAL CREDIT
B1 B0

Vertical asymptote correctly identified: **x = 4** (denominator zero) ✓. The horizontal asymptote was attacked with an unconventional method: setting y = 1 and solving for x, which yielded x = −3/2 (an x-intercept-style result, not an asymptote at all). The correct horizontal asymptote is **y = 3**, found by taking the limit as x → ∞: y → 3x/x = 3, or equivalently rewriting y = 3 + (−14)/(x − 4). **B0**. Mark cost: 1.

10(b) [3/3]
FULL MARKS
B1 M1 A1

x = 0: y = 2/(−4) = **−0.5**, point **(0, −0.5)** ✓. y = 0: 3x + 2 = 0 ⇒ x = −2/3, point **(−2/3, 0)** ✓. Both intercepts located cleanly — arithmetic precise on signs.

10(c) [1/4]
WEAK
B1 B0 B0 B0

Sketch shows one branch (the x > 4 branch, climbing steeply) with the vertical asymptote x = 4 indicated. **The second branch (x < 4)** — which carries both intercepts (0, −0.5) and (−2/3, 0) — **is missing**. The horizontal asymptote y = 3 is not drawn. Intercepts not labelled on the curve. B1 awarded for the partial shape (single hyperbolic branch, vertical asymptote indicated). Mark cost: 3.

10(d) [1/5]
WEAK
M1 A0 A0 M0 A0

Quotient-rule structure attempted (numerator: derivative of top × bottom − top × derivative of bottom; denominator: bottom squared) — M1. However, the “top × derivative of bottom” term was written with a coefficient of **0** instead of 1, killing the −(3x + 2) contribution and reducing the numerator from the correct **−14** to (3x − 12), which simplifies to 3/(x − 4). This propagated into f′(2) = −3/2 (canonical: **−7/2**) and the tangent equation y = −(3/2)x − 1 (canonical: **y = −(7/2)x + 3**, or 7x + 2y − 6 = 0). Mark cost: 4.

10(e) [0/3]
NO MARKS
M0 M0 A0

Not attempted. Rewriting y = (3x + 2)/(x − 4) = 3 − 14/(x − 4) shows the curve takes every real value except **y = 3**. The form “p < y < q” collapses to a single excluded value y = 3 here — an unusual but acceptable answer recognising the horizontal asymptote. Mark cost: 3.

PERFORMANCE OVERVIEW

Holistic narrative · What the script tells us about the candidate

ZUBAYER has produced a **Strong Pass at 63%** on this Further Pure Mathematics Paper 2 mock, placing him firmly in the **Grade B** band. The paper splits cleanly into two halves. The **front half** — Q1 through Q7 — is examiner-grade work: Q1 (5/5), Q3 (7/7), and Q4 (7/8) demonstrate confident command of mensuration with radians, kinematic differentiation, and the factor theorem; Q5 (7/9), Q6 (9/10), and Q7 (10/11) show deep facility with Vieta's relations, log-law manipulation, geometric-series ratio elimination, and logarithmic inequality solving. **49 of the front-half's 56 marks were captured** — an 87.5% conversion rate that, on its own, would correspond to a high A. The **back half** — Q8, Q9, Q10 — tells a different story: 14 of 44 marks (31.8%). The single largest cause is **blank sub-parts**: Q8(b) [4 marks blank], Q9(c)(d)(e) [9 marks blank], Q10(e) [3 marks blank]. These are not knowledge gaps so much as **time-management or confidence-in-the-moment** failures. The work that *was* attempted in the back half is not weak in absolute terms — Q8(a) was full marks, Q9(b) was full marks, Q10(b) was full marks — suggesting the candidate's ceiling on those topics is far higher than the visible score. A focused intervention here would lift the paper into the A grade band without changing any of the front-half technique.

STRENGTHS DEMONSTRATED

Repeatable techniques that consistently captured marks

Differentiation Discipline — Power Rule Across Contexts
Q3 + Q4 + Q7 · FULL

Q3 turned a kinematics displacement into velocity ($6t^2 - 18t + 12$) and then into acceleration ($12t - 18$) without a slip; Q4(a) substituted a value into a cubic and demonstrated zero correctly with conclusion stated; Q7(a) and Q7(c) executed substitution-into-formula work flawlessly. The chain of differentiation → setting equal to zero → solving was applied as a unified pattern across Q3 and Q7 — exactly the modular fluency CAIE rewards.

Log-Law Manipulation — Q6(b) Was Examiner-Grade
Q6 · 6 of 7

$2 \log_5 x \rightarrow \log_5 x^2$ (power law), then $\log_5(x^2) - \log_5(x+6) \rightarrow \log_5(x^2/(x+6))$ (quotient law), then $\log_5(\cdot) = 1 \rightarrow (\cdot) = 5$ (exponent recovery): three log laws applied in succession with no false steps. The resulting quadratic $x^2 - 5x - 30 = 0$ was solved in exact form $(5 \pm \sqrt{145})/2$ — surd discipline maintained, no premature decimal-rounding. The single missed mark was the root-rejection step at the very end, which is a habit-forming issue, not a technique issue.

Vieta's Relations & the Symmetric-Sum Identity
Q5(a)+(b) · 5 of 5

$\alpha + \beta = 5/3$ and $\alpha\beta = 1/3$ written down with sign of $-b/a$ managed correctly — a B1 each. The identity $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$ was recalled and applied with clean fraction arithmetic to 19/9. The candidate clearly knows the foundational Vieta toolkit; the (c) error sits one inferential step downstream and is recoverable.

Compound-Angle Expansion with Negative-Angle Identities
Q8(a) · FULL

Expanded $\sin(A + B)$ and $\sin(A - B)$ the long way — via $\cos(-B) = \cos B$ and $\sin(-B) = -\sin B$ — an alternative that requires more steps but demonstrates deeper understanding of the underlying parity of the trig functions. The $2 \sin A \cos B$ identity was reached cleanly. This is the foundation that Q8(b)(c)(d) should have built on; the technique is in place, the application momentum was missing.

AREAS OF WEAKNESS — REQUIRING ATTENTION

Patterns of mark loss · Ranked by impact on total score

Blank Sub-Parts — The Single Largest Mark Drain
−16 marks

Q8(b) [−4], Q9(c) [−2], Q9(d) [−4], Q9(e) [−3], Q10(e) [−3] — all left blank. CAIE positive marking awards **nothing for nothing**: even partial setup (writing OP = μON in Q9(c), or attempting one term of the quotient rule, or a one-line definition of the "y cannot take" idea) would have captured M1s. The pattern concentrates in the longer, multi-step questions at the back of the paper, suggesting **time pressure and decision-fatigue** rather than topic ignorance. This single behavioural fix has the highest ROI on the entire paper.

Quotient-Rule Coefficient Slip — Q10(d)
−4 marks

Wrote the quotient-rule numerator as "$3(x - 4) - \mathbf{0}(3x + 2)$" — the second coefficient should be 1 (the derivative of $(x - 4)$ with respect to x). This single-character error reduced the numerator from the correct −14 to $(3x - 12)$, giving $f'(2) = -3/2$ instead of $-7/2$, and propagating into a wholly different tangent line. Highest-cost arithmetic slip on the paper.

Symmetric-Function Identity — Q5(c)
−2 marks

Wrote $\alpha/\beta + \beta/\alpha = (\alpha + \beta)/(\alpha\beta)$ — the two terms have a common denominator of $\alpha\beta$, but the numerators do not simply add to $\alpha + \beta$. The correct expansion is $(\alpha^2 + \beta^2)/(\alpha\beta)$, which connects directly to the (b) result of 19/9. Memorisation gap in the symmetric-function toolkit. Trivial to fix.

Formula-Sheet Inversion — S_∞ in Q7(d)
−1 mark

Wrote $S_\infty = a/(r - 1)$ instead of $a/(1 - r)$. The correct formula is printed on the formulae sheet supplied with the paper — the student didn't consult it. Result was −64 instead of +64; the negative sign should have been a self-flagging warning that the formula was inverted (a positive geometric series with $0 < r < 1$ must have a positive sum). A glance at the formulae page would have caught this.

Ratio Interpretation in Vectors — Q9(a)(i)
CASCADED LOSS

AN:NB = 2:1 means AN takes 2 of 3 parts of AB, so AN = (2/3)AB. The student wrote AN = AB/2 (treating N as the midpoint). The downstream consequence was severe: ON came out as $(a + b)/2$ instead of $(1/3)a + (2/3)b$, which would have made (c)(d)(e) follow-through-marketable even on the wrong base. Combined with the (c)(d)(e) blanks, this is the single most expensive error on the script.

TARGETED IMPROVEMENT ADVICE

Five priorities ranked by mark-recovery potential

PRIORIT 1

"Always Write Something" — The Anti-Blank Habit

In a 100-mark paper with 16 marks lost to blank sub-parts, this is the single highest-leverage discipline change available. **Rule**: for every sub-part, write at minimum one line of valid setup — the formula being used, the equation being solved, or the geometric relationship being invoked. CAIE marks **methods**, not just answers; an attempted setup is worth 1–2 M1s even when the algebra collapses afterwards. Q9(c) needed only "OP = μON = μ((1/3)a + (2/3)b)" for an M1; Q10(e) needed only "y = 3 − 14/(x − 4) so y ≠ 3" for an A1. Estimated recovery on this script alone: **4–6 marks**.

PRIORIT 2

Read the Formulae Sheet First — Then Reference It

The S_∞ formula was printed on the supplied sheet, and the candidate still wrote a/(r−1) instead of a/(1−r) — a direct loss of 1 mark. **Build the habit**: before starting Q1, spend 60 seconds reading every formula on the sheet. Then, every time a series, log, calculus, or trig formula is invoked in a working, glance at the sheet to verify. The mark scheme assumes you have the sheet open; not consulting it is leaving free marks on the table.

PRIORIT 3

Memorise the Symmetric-Function Identities for Roots

For roots α, β of a quadratic: **(i)** $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$; **(ii)** $1/\alpha + 1/\beta = (\alpha + \beta)/(\alpha\beta)$; **(iii)** $\alpha/\beta + \beta/\alpha = (\alpha^2 + \beta^2)/(\alpha\beta)$; **(iv)** $\alpha^3 + \beta^3 = (\alpha + \beta)^3 - 3\alpha\beta(\alpha + \beta)$. The Q5(c) error confused (ii) with (iii). Write all four on a flashcard; recall them on every "new equation with roots" question.

PRIORIT 4

Drill the Quotient Rule on a Standard Set of Examples

For y = u/v: dy/dx = (v·u′ − u·v′)/v^2. The Q10(d) error was writing 0 instead of 1 for the derivative of (x − 4). Drill **10 standard examples** — (3x+2)/(x−4), (x^2+1)/(x−1), (sin x)/(x), (e^x)/(x^2) — until the "v·u′ minus u·v′" pattern is muscle memory. Always write the rule above the working as a labelled identity before substituting. This single habit costs nothing to acquire and saves 4–5 marks per paper.

PRIORIT 5

Master the "m of (m+n) Parts" Rule for Vector Ratios

AN:NB = 2:1 ⇒ AN = (2/3)AB, NOT AN = AB/2. The general rule: if a point divides a segment in ratio m:n from the start, the "from-start" vector is (m/(m+n)) × (whole). Practise on five examples (1:2, 2:1, 3:1, 1:3, 2:3) before the live paper. With this single habit fixed, Q9 in the live paper is recoverable in full. **Estimated recovery on a comparable Q9: 8–10 marks.**

" TEACHER'S COMMENT

ZUBAYER has produced a **Strong Pass at 63%** on this Further Pure Mathematics Paper 2 mock — a Grade B performance with a clear and recoverable upside to Grade A. The front-half work (Q1–Q7) is genuinely impressive: 49 of 56 marks captured at 87.5%, with full marks on Q1 and Q3, and only minor surface-level slips on Q4(b), Q5(c), Q6(b), and Q7(d) preventing a near-perfect first half. The technique is in place; the slips are habit-of-mind issues (root-rejection in logs, formula-sheet glance for S_∞, symmetric-function identity recall) that 30 minutes of focused review will eliminate. The back-half story is different in *character*, not in *capability*: 16 marks were left blank on the page, not got wrong — Q8(b), Q9(c)(d)(e), and Q10(e) all show no working at all. That is not a mathematics problem; it is a time/confidence/decision problem. The work that *was* attempted in the back half — Q8(a), Q9(a)(ii) and (b), Q10(b) — was all full marks, which tells me the topic-level command is far stronger than the visible total suggests. **The single most important behavioural change for the live 4PM1/02 paper** is the "always write something" rule from Priority 1: even one line of correct setup recovers 1–2 M1s per blank sub-part. Combined with the formula-sheet habit and the vector-ratio fix, an A grade is well within reach.

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PERFORMANCE TREND TRACKER

Where you are · where you came from · where to aim

PREVIOUS SET		CURRENT SET (CURRENT)		NEXT SET TARGET
—	→ +0%	63%	→ +12%	75%
Baseline		Grade B		Grade A

NEXT STEPS — ACTION CHECKLIST

Three concrete actions before the live paper

1

Adopt the "Always Write Something" Rule

Drill on the next two practice sets. For every blank sub-part, write at minimum one line of valid setup. Self-audit: at the end of each paper, count blanks. Target < 2 per paper.

2

Build a One-Page Formula & Identity Card

Symmetric-root identities (4 forms), S_∞ & S_n formulae, quotient rule, sin 3θ / cos 3θ expansions. Read once before each timed paper.

3

Re-do Q8, Q9, Q10 Untimed

Set aside 90 minutes to redo the back half of this paper without time pressure. Compare against the model answers. Confirm the topic-level mastery is genuinely there.

REPORT VERIFIED & STANDARDISED

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Authorised Signatory

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