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NATIONAL 5 MATHEMATICS

COMMON MISTAKES & DIAGNOSTIC REPAIR HANDBOOK

Evidence-led error database | 2022-2026 course-report evidence | repair routines | retest rules

Course	National 5 Mathematics
Course code	C847 75
Course assessment code	X847 75
Level / total marks	SCQF Level 5 | 90 marks

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Evidence method

Each entry below is independently worded. “ER” means the error pattern is supported by one or more published National 5 Mathematics course reports. The reports do not provide a five-year frequency count for every misconception, so this handbook does not invent percentages or rankings. Where a pattern recurs across multiple reports, the source years are shown.

The 2026 report also advises maintaining number skills for Paper 1, maintaining basic algebra, practising data-set comparison, annotating angles on diagrams, avoiding premature rounding, and preparing across the full specification rather than only recent past-paper patterns.

Source basis: CR22; CR23; CR24; CR25; CR26

01. Reverse percentages

Evidence label	ER - examiner/course-report evidenced
Typical error	Treating a reverse-percentage problem as a forward percentage calculation
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Use the final-value multiplier and divide to recover the original.
Rapid retest	Complete one fresh reverse percentages question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR25; CR26

02. Fractions

Evidence label	ER - examiner/course-report evidenced
Typical error	Incorrectly evaluating fraction or mixed-number arithmetic on Paper 1
Why it costs marks	The mathematical process, notation or

	interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Convert mixed numbers carefully and show exact numerator/denominator arithmetic.
Rapid retest	Complete one fresh fractions question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR25; CR26

03. Interquartile range

Evidence label	ER - examiner/course-report evidenced
Typical error	Giving the range or semi-IQR instead of IQR
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Order the data, find Q1 and Q3, then compute Q3-Q1.
Rapid retest	Complete one fresh interquartile range question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR25; CR26

04. Comparing data

Evidence label	ER - examiner/course-report evidenced

Typical error	Quoting statistics without contextual comparison
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Compare centre and spread using the variable/context, e.g. “higher median waiting time” and “smaller IQR means more consistent”.
Rapid retest	Complete one fresh comparing data question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR25; CR26

05. Straight-line equation

Evidence label	ER - examiner/course-report evidenced
Typical error	Swapping x and y coordinates or rearranging point-gradient form incorrectly
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Write the coordinate pairs vertically; compute gradient in consistent order; substitute one point and expand carefully.
Rapid retest	Complete one fresh straight-line equation question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days,

	with working that would allow a marker to follow the method.
Published evidence	CR22; CR25; CR26

06. Function notation

Evidence label	ER - examiner/course-report evidenced
Typical error	Substituting the wrong input or mishandling negative powers/cubes
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Replace every x with brackets around the input, especially negative values.
Rapid retest	Complete one fresh function notation question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR25

07. Trig graph coordinates

Evidence label	ER - examiner/course-report evidenced
Typical error	Reading x-coordinate for y-coordinate or vice versa
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	State ordered pair (x,y); trace

	vertically/horizontally from the graph axes.
Rapid retest	Complete one fresh trig graph coordinates question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR25

08. Indices

Evidence label	ER - examiner/course-report evidenced
Typical error	Applying index rules to coefficients/terms incorrectly or stopping before full simplification
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Separate bases, coefficients and powers; verify with a simple numeric analogue.
Rapid retest	Complete one fresh indices question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR25; CR26

09. Discriminant

Evidence label	ER - examiner/course-report evidenced
Typical error	Calculating b^2-4ac but not describing the roots correctly

Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Use the sign of the discriminant to state two real distinct / repeated real / no real roots.
Rapid retest	Complete one fresh discriminant question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR25

10. Surds

Evidence label	ER - examiner/course-report evidenced
Typical error	Failing to simplify fully after rationalising or magnitude calculations
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Look for square factors at the final step and keep the denominator rational.
Rapid retest	Complete one fresh surds question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR25; CR26

11. Vectors

Evidence label	ER - examiner/course-report evidenced
Typical error	Finding vector components but not drawing/representing the resultant correctly
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Check start/end points and arrow direction; distinguish resultant vector from magnitude.
Rapid retest	Complete one fresh vectors question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR25

12. Algebraic fractions

Evidence label	ER - examiner/course-report evidenced
Typical error	Cancelling terms across addition or expanding when factorisation is needed
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Factor first; only cancel whole common factors; for division multiply by the reciprocal.
Rapid retest	Complete one fresh algebraic fractions question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days,

	with working that would allow a marker to follow the method.
Published evidence	CR22; CR25; CR26

13. Quadratic modelling

Evidence label	ER - examiner/course-report evidenced
Typical error	Constructing a quadratic incorrectly from a context
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Define the variable, form each expression, equate the correct quantities, then expand/rearrange to zero.
Rapid retest	Complete one fresh quadratic modelling question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR25; CR26

14. Quadratic solutions in context

Evidence label	ER - examiner/course-report evidenced
Typical error	Keeping an inadmissible negative root or solving as if linear
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Solve both roots, then reject only with a

	contextual reason such as a negative length.
Rapid retest	Complete one fresh quadratic solutions in context question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR25; CR26

15. Compound change

Evidence label	ER - examiner/course-report evidenced
Typical error	Adding annual percentages instead of compounding
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Use repeated multipliers such as 1.04^n or 0.72^n.
Rapid retest	Complete one fresh compound change question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR25; CR26

16. Rounding

Evidence label	ER - examiner/course-report evidenced
Typical error	Premature rounding or wrong significant figures
Why it costs marks	The mathematical process, notation or

	interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Retain calculator precision in intermediate work; round only the final requested answer.
Rapid retest	Complete one fresh rounding question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR25; CR26

17. Mean and standard deviation

Evidence label	ER - examiner/course-report evidenced
Typical error	Using vague words like “better/more consistent” without correct statistical interpretation
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Higher/lower mean describes centre; smaller standard deviation describes less spread/more consistency.
Rapid retest	Complete one fresh mean and standard deviation question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR25

18. Sector/segment area

Evidence label	ER - examiner/course-report evidenced
Typical error	Using circumference/arc formulas for area or omitting triangle subtraction for a segment
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Separate sector area from triangle area; segment area = sector - triangle when appropriate.
Rapid retest	Complete one fresh sector/segment area question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR25; CR26

19. 3D Pythagoras

Evidence label	ER - examiner/course-report evidenced
Typical error	Finding one face diagonal and stopping
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Identify the second right triangle involving the face diagonal and the required space diagonal.
Rapid retest	Complete one fresh 3d pythagoras question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to

	follow the method.
Published evidence	CR22; CR25

20. Changing the subject

Evidence label	ER - examiner/course-report evidenced
Typical error	Introducing square roots simply because a squared term appears somewhere
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Isolate the target systematically; take a square root only if the target itself remains squared.
Rapid retest	Complete one fresh changing the subject question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR25; CR26

21. Simultaneous equations

Evidence label	ER - examiner/course-report evidenced
Typical error	Stopping at variable values without answering the context
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Translate solved variables back into the requested quantities, units or prices.

Rapid retest	Complete one fresh simultaneous equations question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR25; CR26

22. Similarity

Evidence label	ER - examiner/course-report evidenced
Typical error	Using the linear scale factor directly on areas or volumes
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Use k, k^2 or k^3 according to dimension; do not round the scale factor early.
Rapid retest	Complete one fresh similarity question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR25; CR26

23. Sine rule and bearings

Evidence label	ER - examiner/course-report evidenced
Typical error	Using a right-triangle method in a non-right triangle or mismatching side-angle pairs
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete;

	follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Sketch the triangle, mark known pairs, use sine rule only with matching opposite side/angle pairs.
Rapid retest	Complete one fresh sine rule and bearings question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR25

24. Cosine rule

Evidence label	ER - examiner/course-report evidenced
Typical error	Using the wrong sign/order or choosing it when data fit another rule
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Write the formula first, label opposite side/angle, substitute with brackets.
Rapid retest	Complete one fresh cosine rule question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR26

25. Trig equations

Evidence label	ER - examiner/course-report evidenced
Typical error	Finding only the first solution in 0°–360°
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Use related angles/quadrants and list every solution in the stated interval.
Rapid retest	Complete one fresh trig equations question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR26

26. Trigonometric identities

Evidence label	ER - examiner/course-report evidenced
Typical error	Trying to prove both sides at once or not factorising/splitting fractions
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Transform one side only using $\sin^2x+\cos^2x=1$ and $\tan x=\sin x/\cos x$; make each algebraic step equivalent.
Rapid retest	Complete one fresh trigonometric identities question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days,

	with working that would allow a marker to follow the method.
Published evidence	CR22; CR26

27. Circle angles

Evidence label	ER - examiner/course-report evidenced
Typical error	Giving the wrong (obtuse/reflex) angle or unsupported calculations
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Mark each calculated angle directly on the diagram and verify which named angle the question requests.
Rapid retest	Complete one fresh circle angles question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR26

28. Converse of Pythagoras

Evidence label	ER - examiner/course-report evidenced
Typical error	Writing $a^2+b^2=c^2$ as an assumed equality rather than testing it
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Calculate the two sides separately and conclude

	right-angled only if they are equal, naming the right angle.
Rapid retest	Complete one fresh converse of pythagoras question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR26

29. Coordinate notation

Evidence label	ER - examiner/course-report evidenced
Typical error	Omitting brackets or reversing coordinate order
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Write coordinates as ordered tuples and check axis labels.
Rapid retest	Complete one fresh coordinate notation question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR25; CR26

30. Scientific notation

Evidence label	ER - examiner/course-report evidenced
Typical error	Choosing multiplication/division incorrectly or failing standard form normalization

Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Estimate order of magnitude first; ensure final coefficient is at least 1 and less than 10.
Rapid retest	Complete one fresh scientific notation question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR25

31. Volume and units

Evidence label	ER - examiner/course-report evidenced
Typical error	Using wrong solid formula, wrong dimension, or incorrect cubic-unit conversion
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Identify solid and dimensions before substitution; convert lengths before cubing and finish in cubic units.
Rapid retest	Complete one fresh volume and units question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR25; CR26

32. Quadratic sketch

Evidence label	ER - examiner/course-report evidenced
Typical error	Finding roots but missing turning point/y-intercept or plotting quadrants incorrectly
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Build a feature checklist: roots, y-intercept, axis, turning point, opening direction.
Rapid retest	Complete one fresh quadratic sketch question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR26

33. Linear inequations

Evidence label	ER - examiner/course-report evidenced
Typical error	Forgetting to reverse the sign when dividing/multiplying by a negative
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Treat the sign reversal as a mandatory final operation and test a value from the solution set.
Rapid retest	Complete one fresh linear inequations question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days,

	with working that would allow a marker to follow the method.
Published evidence	CR26

34. Magnitude of vector

Evidence label	ER - examiner/course-report evidenced
Typical error	Mishandling negative components or failing to simplify the surd
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Square each component before adding; then simplify the square root.
Rapid retest	Complete one fresh magnitude of vector question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR26

35. Area of triangle

Evidence label	ER - examiner/course-report evidenced
Typical error	Using sin of a side/incorrect angle, or forgetting basic 1/2 bh when that is the intended route
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Identify the included angle for 1/2ab sin C or use

	1/2bh when perpendicular height is available.
Rapid retest	Complete one fresh area of triangle question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR25

36. Communication

Evidence label	ER - examiner/course-report evidenced
Typical error	Correct calculations not attached to named angles or not interpreted in context
Why it costs marks	The mathematical process, notation or interpretation becomes invalid or incomplete; follow-through marks may be limited if the method is not consistently communicated.
Repair routine	Put working beside the relevant diagram feature and finish with a sentence/unit where the question is contextual.
Rapid retest	Complete one fresh communication question without notes. Then explain the key check aloud or in one sentence.
Mastery rule	Two correct unseen questions on different days, with working that would allow a marker to follow the method.
Published evidence	CR22; CR26

Diagnostic log

Topic	First score	Error code	Repair completed	Retest score	Next review

High-priority habits from recent course reports

- Maintain non-calculator number fluency.
- Maintain basic algebraic manipulation: rearrange, factorise and simplify.
- Compare data using correct statistical vocabulary and context.
- Write calculated angle values on the diagram.
- Avoid premature rounding in intermediate calculations.
- For contextual problems, communicate the final result in words/units.
- Prepare all specified skills, not only topics seen in the latest paper.

References and evidence base

The resource is independently written. Source documents are used to verify course scope, assessment structure, grade boundaries, formula provision and published observations about candidate performance. The wording below is bibliographic rather than a reproduction of assessment material.

- **[CR22]** SQA, National 5 Mathematics Course Report 2022. https://www.sqa.org.uk/files_ccc/2022-n5-course-report-mathematics.pdf
- **[CR23]** SQA, National 5 Mathematics Course Report 2023. https://www.sqa.org.uk/files_ccc/2023-n5-course-report-mathematics.pdf
- **[CR24]** SQA, National 5 Mathematics Course Report 2024. https://www.sqa.org.uk/files_ccc/2024-n5-course-report-mathematics.pdf
- **[CR25]** SQA, National 5 Mathematics Course Report 2025. https://www.sqa.org.uk/files_ccc/2025-n5-course-report-mathematics.pdf
- **[CR26]** Qualifications Scotland, National 5 Mathematics Course Report 2026. https://www.sqa.org.uk/sqa/files_ccc/2026-n5-course-report-mathematics.pdf
- **[SPEC]** Qualifications Scotland / SQA, National 5 Mathematics Course Specification, May 2023, version 3.0. https://www.sqa.org.uk/files_ccc/n5-course-spec-mathematics.pdf
- **[PP]** Qualifications Scotland, National 5 Mathematics past papers and marking instructions. https://www.sqa.org.uk/pastpapers/findpastpaper.htm?_includeMi=on&level=N5&subject=Mathematics

Publication note

On 1 February 2026, Qualifications Scotland replaced SQA as Scotland’s national awarding body. Qualifications Scotland states that legacy SQA documents on the National 5 Mathematics subject page remain current until updated. This resource therefore cites both names where historically appropriate.