

GCSE ONLINE TUTORING

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COMMON MISTAKES & DIAGNOSTIC REPAIR HANDBOOK

Evidence-labelled misconceptions, repair routines and retest prompts for OCR J560

**Cambridge OCR GCSE (9-1) Mathematics J560 | Foundation and Higher | Website
reference edition | 2026**

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Evidence standard

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Evidence labels

ER = directly supported by publicly available Cambridge OCR examiner-report commentary used in this handbook (principally 2024 reports). SPEC = independently authored diagnostic risk derived from the mathematical demand of the current J560 specification. SPEC entries are not presented as frequency claims.

Recurring examiner messages

Across published OCR reports, weaker responses are repeatedly associated with unclear or insufficient working, inefficient calculator use, early rounding, failure to follow question instructions, weak algebraic manipulation and incorrect selection/evaluation of formulae. The database below converts those messages into student-facing repair actions. [ER24-F2] [ER24-H4] [ER24-H6] [ER24-NF1] [ER24-NH6]

01 | Exam technique: Rounding intermediate values too early

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Keep full calculator precision through the method; round once at the end unless instructed otherwise.

Rapid retest: Recalculate one multi-step problem using full precision and compare.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

02 | Exam technique: Showing too little working on multi-mark questions

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Write the mathematical stages, not only a calculator result. Method marks can survive a later arithmetic slip.

Rapid retest: Can another student reconstruct your method from the page?

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

03 | Exam technique: Ignoring an instruction such as “estimate”, “show that”, or stated accuracy

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Underline the command/instruction before calculating; make the requested evidence visible.

Rapid retest: State in one sentence what the command word requires.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

04 | Calculator: Using inefficient non-calculator methods on a calculator paper

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Use calculator functions deliberately for percentages, roots, trig and repeated operations.

Rapid retest: Solve the same task once efficiently and once manually; compare error risk.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

05 | Number: Incorrect order of operations or missing brackets

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Write the intended structure before calculator entry; use brackets to preserve priority.

Rapid retest: Estimate the sign and size before pressing equals.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

06 | Percentages: Using the wrong multiplier for increase/decrease

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Increase by p%: multiply by $1 + p/100$. Decrease by p%: multiply by $1 - p/100$.

Rapid retest: Explain why 20% off is $\times 0.8$, not $\times 0.2$.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

07 | Fractions: Adding denominators when adding fractions

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Find a common denominator, convert each fraction, then add numerators only.

Rapid retest: Check using decimals after obtaining the exact fraction.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

08 | Standard form: Incorrect exponent when moving the decimal point

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Write coefficient between 1 and 10, then count place shifts carefully.

Rapid retest: Convert back to ordinary notation as a check.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

09 | Bounds: Using rounded values as if exact

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Translate a rounded measurement into an interval before combining bounds.

Rapid retest: Write the lower and upper endpoint before calculating.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

10 | Bounds: Confusing which endpoints create the upper/lower bound

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Reason about whether numerator/denominator or product factors should be large or small.

Rapid retest: State the extremal combination in words first.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

11 | Ratio: Mixing units inside a ratio

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Convert all quantities to the same unit before simplifying.

Rapid retest: Write units next to both quantities before forming the ratio.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

12 | Proportion: Assuming a relationship is direct proportion merely because it rises

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Direct proportion has $y=kx$ and passes through the origin.

Rapid retest: Find y/x for two points; is it constant?

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

13 | Algebra: Expanding brackets with sign errors

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Multiply every term by the factor, including negative signs, then collect like terms.

Rapid retest: Substitute a simple value into original and expanded forms.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

14 | Algebra: Collecting unlike terms

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Only terms with identical variable parts can combine.

Rapid retest: Mark each term by variable/power before collecting.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

15 | Equations: Doing different operations to the two sides

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Maintain balance: whatever operation is applied to one side must be applied to the other.

Rapid retest: Substitute the solution back into the original equation.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

16 | Formulae: Incorrect substitution into a given formula

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Write the formula, then a full substitution line with brackets, then calculate.

Rapid retest: Check each symbol against the given data.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

17 | Quadratics: Factorising with incorrect signs

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Check product and sum conditions, then multiply brackets back out.

Rapid retest: Expansion must reproduce all three original terms.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

18 | Graphs: Reading a scale incorrectly

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Determine the value of one small division before reading coordinates.

Rapid retest: Annotate the axis increment beside the graph.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

19 | Straight lines: Confusing gradient and intercept

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: In $y=mx+c$, m is change in y /change in x ; c is the y -value when $x=0$.

Rapid retest: Pick two points and recalculate m .

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

20 | Transformations: Giving an incomplete transformation description

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Rotation needs centre, angle and direction; reflection needs mirror line; translation needs vector.

Rapid retest: Ask: could someone reproduce the image uniquely from my words?

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

21 | Angles: Using a correct angle value without a valid reason

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Pair each step with the relevant fact: alternate, corresponding, vertically opposite, triangle sum, etc.

Rapid retest: Write a reason next to every angle in a proof chain.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

22 | Circle theorems: Remembering a theorem but applying it to the wrong configuration

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Mark the centre, chord, tangent and subtended arc before choosing a theorem.

Rapid retest: Name the exact points/angles involved in the theorem.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

23 | Similarity: Using the linear scale factor for area or volume

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Area factor = k^2 ; volume factor = k^3 .

Rapid retest: Write k , k^2 and k^3 before selecting.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

24 | Mensuration: Using diameter in a radius formula (or vice versa)

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Label r and d explicitly before substituting.

Rapid retest: Check whether $d=2r$ has been used correctly.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

25 | Trigonometry: Choosing a more complex rule when right-angle trig is available

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: First ask: is the triangle right-angled? If yes, Pythagoras/SOHCAHTOA may be simpler.

Rapid retest: Circle the known sides/angle and choose the shortest valid method.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

26 | Cosine rule: Entering b^2+c^2-2bc and forgetting cos A

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Write the complete substituted expression before calculator entry, then square-root only at the final step when finding a side.

Rapid retest: Compare with a rough sketch: is the side length plausible?

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

27 | Probability: Adding probabilities when events should be multiplied

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: “AND” along independent branches usually multiplies; “OR” across mutually exclusive outcomes usually adds.

Rapid retest: Draw a tree/sample space to verify.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

28 | Probability: Treating events as independent without justification

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Use conditional information when one event changes the probability of another.

Rapid retest: Ask whether knowing B happened changes $P(A)$.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

29 | Statistics: Claiming correlation proves causation

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Describe association only; identify possible lurking variables if asked to interpret.

Rapid retest: Rewrite “causes” as “is associated with” unless causal design is given.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

30 | Statistics: Using frequency instead of frequency density for a histogram

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: For unequal class widths, bar height = frequency/class width.

Rapid retest: Check that bar area, not height, represents frequency.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

31 | Time: Treating 40 min as 0.40 h

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Convert minutes by dividing by 60, not by 100.

Rapid retest: Check 30 min = 0.5 h as a benchmark.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

32 | Accuracy: Confusing significant figures with decimal places

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Decimal places count digits after decimal point; significant figures start at first non-zero digit.

Rapid retest: Round the same number to 2 dp and 2 sf and compare.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

33 | Higher algebra: Trial-and-improvement used where a formal algebraic method is expected

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Identify whether factorisation, formula, simultaneous equations or rearrangement gives a direct route.

Rapid retest: Solve once formally, then use substitution to verify.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

34 | Higher geometry: Using $\frac{1}{2}ab \sin C$ with the wrong included angle

Evidence: Examiner-report evidenced [ER24-F2/ER24-H4/ER24-H6/ER24-NF1/ER24-NH6 as applicable]

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: The angle C must lie between sides a and b in that formula.

Rapid retest: Highlight the two sides and the included angle on the diagram.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

35 | Vectors: Treating a vector as a length only

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Keep direction and signed components; use vector paths consistently.

Rapid retest: Check two different routes give the same resultant vector.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

36 | Functions: Reading $f(x)$ as f multiplied by x

Evidence: Specification-derived diagnostic risk

Why marks are lost: the error either changes the mathematical result, removes evidence needed for method/reasoning marks, or shows that the method selected does not match the structure of the problem.

Repair routine: Treat f as a rule/name; $f(3)$ means evaluate the function at input 3.

Rapid retest: Write an input-output sentence before substitution.

☐ I can explain the error. ☐ I can complete one fresh question correctly. ☐ I can identify the trigger that tells me which method to use next time.

Diagnostic log

Date	Mistake ID	Topic	What caused it?	Repair completed	Retest result

References and source register

[OCR-SPEC] Cambridge OCR, GCSE (9-1) Mathematics J560 Specification, current specification (version 2.1 update announced 17 September 2026). <https://www.ocr.org.uk/Images/168982-specification-gcse-mathematics.pdf>

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