

NUMBER DIAGNOSTIC AND REPAIR

Calculate, explain and check

GCSE Mathematics 1MA1 • L004

The goal and the evidence

Fluency, reasoning and checking

Diagnose a number error, repair the method, and choose an independent check that tests the original calculation.

Explain a decision. Check independently.

Starting-point diagnostic

R1–R3 • Attempt before feedback

$$-7 - (-5); (-4) \times (-3)$$

$$18 \div 3 \times 2; 7 + 3 \times (-2)$$

$$0.48 \times 100; 6.286 \text{ to 2 d.p.}$$

Wider prerequisite screen

Ungraded • Plan support for later units

$x = 3$: find $2x + 1$.

Rectangle 5 cm by 3 cm: area?

Mean of 2, 4 and 9?

Repair the first wrong decision

Wrong: $-6 - (-4) = -10$

Correct: -2 ; check $-2 + (-4) = -6$

Your turn: repair $-8 - (-3) = -11$.

Repair operation order

Wrong: $6 + 2 \times (-5) = -40$

Correct: $6 + (-10) = -4$

Complete: $9 + 2 \times (-4) = 9 + \underline{\quad}$.

Repair a scale error

Wrong: $0.36 \times 100 = 0.036$

Correct: 36; each digit is worth 100 times as much.

Your turn: $0.72 \times 100 = ?$

Choose an independent check

$$19.7 \times 4.2 \approx 20 \times 4 = 80$$

Is 82.74 reasonable?

Does the estimate prove it is exact?

REPAIR, THEN TEST AGAIN

Locate → explain → correct → check

Solve a fresh problem without the prompt.

Diagnostic pause

Which checks $-6 - (-4) = -2$?

A $-2 + (-4) = -6$

B Repeat $-6 - (-4)$

C $-2 + 4 = 2$

Careful variation

A1 • Explain what changes

$$-9 - (-6)$$

$$-32 \div (-8)$$

Give an inverse check for each.

Independent application

A2 • Try without prompts

$$24 \div 4 \times 3$$

$$5 + 2 \times (-6)$$

Show the first operation.

Use the method in context

A3 • Show working

0.84×100 ; 7.386 to 2 d.p.

Estimate 19.7×4.2 using 1 s.f. each.

Intentional practice feedback

Check after attempting A3

84; 7.39; estimate 80

Exact $19.7 \times 4.2 = 82.74$

A claim to test

C1 • Reason, do not just calculate

“I got the same answer twice.”

Does repeating a method prove it is correct?

Deepen the reasoning

C2 • Available to either tier

82.74 or 82.47 for 19.7×4.2 ?

Both are near 80. How will you decide?

Retrieval without notes

Q1–Q6 • Retry after a delay

Q1–Q3

$$-8 - (-5)$$

$$(-3) \times (-7)$$

$$16 \div 4 \times 2$$

Q4–Q6

$$4 + 3 \times (-2)$$

$$0.73 \times 100$$

$$4.687 \rightarrow 2 \text{ d.p.}$$

Independent exit evidence

P1–P2 • Teacher review • 4 marks

P1 • 2 MARKS

Repair $8 + 2 \times (-3) = -30$.

Name the first error.

P2 • 2 MARKS

Repair $0.57 \times 100 = 5.7$.
Give an inverse check.

Feedback and next steps

P3 • Completion is not mastery

Name the decision you corrected.

Choose a fresh question and a retry date.

Before the next lesson

L005: factors, multiples and primes

Complete F1 tomorrow without notes.

Read and attempt F2; bring one question.

Optional stretch

A learner calculates $-7 - (-12) = -19$. Locate the first error and repair it.

Show a method. Explain a check or counterexample.

Optional deep challenge

Create an independent check for $35 \times 0.8 = 28$ that does not simply repeat the multiplication.

Show a method. Explain a check or counterexample.

L004 Recall & Review

Number diagnostic and repair



Fresh evidence: prove the objective

Solve a new question without prompts. Explain one check, then correct one error in your working.

Objective: Diagnose a number error, repair the method, and choose an independent check that tests the original calculation.

Write the next practice step before you leave. It must test the method again, not simply copy today's example.

Feedback language

Use the full phrases before the abbreviations.

What Went Well (WWW)

I used my working and assessment evidence to identify the exact mathematical step that was secure and the specific misconception that needs attention.

Identify the mathematical method, representation, reasoning or check that improved.

Even Better If (EBI)

I will correct one precise step, explain why the correction works and complete a fresh delayed question without the original scaffold.

Set one precise next-step action and test it on a fresh question.

Extension route

Choose this route only after the core evidence is secure.

Stretch

A learner calculates $-7 - (-12) = -19$. Locate the first error and repair it.

Deep challenge

Create an independent check for $35 \times 0.8 = 28$ that does not simply repeat the multiplication.

Explain your reasoning clearly enough that another learner could check it.