

PLACE VALUE AND ESTIMATION

Calculate, explain and check

GCSE Mathematics 1MA1 • L003

The goal and the evidence

Fluency, reasoning and checking

Use place value to scale and compare decimals, round to stated accuracy, and judge whether a calculation is reasonable.

Explain a decision. Check independently.

Starting-point diagnostic

R1–R3 • Attempt before feedback

$$-8 - (-3); 18 \div 3 \times 2$$

Value of 7 in 5,072

Which is greater: 0.6 or 0.56?

Digits have place value

$$4.063 = 4 + 0.06 + 0.003$$

Ones	Tenths	Hundredths	Thousandths
4	0	6	3

Your turn: expand 2.507.

What is the value of its 5?

Scaling changes digit values

$$0.47 \times 100 = 47$$

$$3.06 \times 10 = ?$$

$$3.06 \div 100 = ?$$

Rounding to decimal places

6.284 → 6.28 at 2 d.p.

6.286 → ? at 2 d.p.

Retain hundredths; inspect thousandths.

Counting significant figures

0.004762 → 0.0048 at 2 s.f.

Your turn: 0.007341 to 2 s.f.

Begin at the first non-zero digit.

ROUND ONCE, AT THE END

Use the original value until the final step.

An estimate checks scale, not every digit.

Diagnostic pause

Choose the rounding decision.

5.078 to 2 decimal places = ?

A 5.07 B 5.08 C 5.1

Careful variation

A1 • Explain what changes

$$0.52 \times 10; 0.52 \times 100$$

$$0.52 \div 10; 0.52 \div 100$$

Explain how the values change.

Independent application

A2 • Try without prompts

9.976 to 2 decimal places

0.00684 to 2 significant figures

4.7 to 2 decimal places

Use the method in context

A3 • Show working

Estimate 19.8×4.9 using 1 s.f. each.

Then calculate. Is 970.2 reasonable?

Intentional practice feedback

Check after attempting A3

$20 \times 5 = 100$; exact 97.02

970.2 is about ten times too large.

A claim to test

C1 • Reason, do not just calculate

Round 2.449 to 1 decimal place.

Compare direct rounding with rounding via 2 d.p.

Deepen the reasoning

C2 • Available to either tier

1.96 m to nearest 0.1 m, then into cm.

Compare 196 cm to the nearest 10 cm.

Retrieval without notes

Q1–Q6 • Q6: use 1 significant figure per factor

Q1–Q3

$$0.38 \times 100$$

$$52 \div 100$$

Value of 7 in 3.074

Q4–Q6

$$8.476 \rightarrow 2 \text{ d.p.}$$

$$0.00684 \rightarrow 2 \text{ s.f.}$$

$$29.7 \times 3.2 \text{ (estimate)}$$

Independent exit evidence

P1–P2 • Teacher review • 4 marks

P1 • 2 MARKS

7.386 to 2 d.p.

Name the decision digit.

P2 • 2 MARKS

Estimate 39.6×2.1 .

Is 831.6 reasonable?

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

L004: number diagnostic and repair

Complete F1 tomorrow without notes.

Read and attempt F2; bring one question.

Optional stretch

Round 0.004976 to two significant figures and estimate 397×0.049 .

Show a method. Explain a check or counterexample.

Optional deep challenge

A number rounds to 3.50 to two decimal places. Give its interval and explain the excluded endpoint.

Show a method. Explain a check or counterexample.

L003 Recall & Review

Place value, decimals and estimation



Fresh evidence: prove the objective

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

Objective: Use place value to scale and compare decimals, round to stated accuracy, and judge whether a calculation is reasonable.

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 selected an efficient numerical method, showed the key steps clearly and checked the sign, size or accuracy of my answer.

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

Even Better If (EBI)

I will make the place-value, sign or operation decision explicit and use estimation or an inverse calculation to check a fresh question.

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

Round 0.004976 to two significant figures and estimate 397×0.049 .

Deep challenge

A number rounds to 3.50 to two decimal places. Give its interval and explain the excluded endpoint.

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