

Fraction reasoning

Pearson Edexcel GCSE Mathematics 1MA1 • L008
Foundation and Higher • 60 minutes • Lesson resources

REACH FOR THE STAR | GCSE MATHEMATICS

Select, explain and check fraction methods; diagnose misconceptions and transfer a repaired method to a fresh problem.

Work without a calculator except where a check is invited. Write on the lines or replace them with typed answers. Attempt before reading intentional practice feedback.

Connect & Check

Counterexample: one case that disproves an always claim. Inverse check: reverse an operation.

Unit fraction: numerator 1. Systematic list: organised list that avoids omissions and repeats.

R1

Calculate $\frac{1}{2} + \frac{1}{4}$ and $(\frac{3}{4}) \div (\frac{1}{4})$.

R2

Which is larger, $\frac{2}{3}$ or $\frac{3}{5}$? Give an exact comparison.

R3

Calculate $-8 - (-3)$ and $3 + 2 \times 4$.

Share | In pairs, predict the first step for this problem: A check must test the original meaning. If $1/2 + 1/3$ is given as $2/5$, the result is below $1/2$ although a positive amount was added. Renaming gives $3/6 + 2/6 = 5/6$. Subtracting $1/3$ from $5/6$ Compare your reasons before using the worked model.

Present through worked examples

A check must test the original meaning. If $1/2 + 1/3$ is given as $2/5$, the result is below $1/2$ although a positive amount was added. Renaming gives $3/6 + 2/6 = 5/6$. Subtracting $1/3$ from $5/6$ returns $1/2$.

D1

Wrong: $1/2 + 1/3 = 2/5$. Model repair: $3/6 + 2/6 = 5/6$. Now repair $1/3 + 1/4 = 2/7$.

D2

Wrong: $(2/3) \div (1/6) = 2/18$. Model repair: $(2/3) \times 6 = 4$. Now calculate $(3/5) \div (1/10)$.

D3

Model: $5/6 - 1/2 = 1/3$, checked by $1/3 + 1/2 = 5/6$. Calculate $7/8 - 1/4$ and check.

D4

Model: three quarters of 2 litres is $(3/4) \times 2 = 1 \frac{1}{2}$ litres. Find two thirds of $3/4$ litre.

Apply with less support

Attempt without prompts, identify the first incorrect decision, explain the repair, then solve a fresh matched problem. Use common units for $+/−$ and a reciprocal for $÷$. List possibilities systematically when the problem asks for combinations.

A1

Calculate and check (a) $1/4 + 1/6$ (b) $3/4 - 1/6$.

A2

Calculate (a) $(2/5) \times (3/4)$ (b) $(2/5) \div (3/4)$. Explain why the results differ.

A3

A full tank holds 12 litres. It is $3/4$ full. Then $1/3$ of the water currently in it is used. How much remains?

Optional support: Start with twelfths.

Optional check after A3: $12 \times (3 \div 4) \times (2 \div 3) = 6$. Use brackets around each fraction and identify what each factor represents before entering it.

Apply and extend reasoning

C1

A learner says $\frac{1}{2}$ of $\frac{1}{3}$ equals $\frac{1}{3}$ of $\frac{1}{2}$. Explain why and give the exact value.

C2

Two shirts, red and blue, can each be worn with black, grey or white trousers. List all outfits. Explain how a list avoids omissions.

Intentional practice feedback — read after attempting

A1: $\frac{5}{12}$; $\frac{7}{12}$.

A2: $\frac{3}{10}$; $\frac{8}{15}$.

A3: 6 litres.

C1: Both equal $\frac{1}{6}$.

C2: R-black, R-grey, R-white, B-black, B-grey, B-white: 6.

Correct one response and explain your change. Stretch is available to either tier; temporary support needs do not determine entry tier.

Recall & Review through retrieval

Work without notes. Six retrieval points; this attempt does not establish mastery. Equivalent exact numeric forms are accepted. Where accuracy is requested, also state the requested form in your written work.

Q1 $\frac{1}{4} + \frac{1}{6}$

Q2 $\frac{2}{5} \div \frac{1}{5}$

Q3 $\frac{3}{4} \times \frac{2}{3}$

Q4 HCF of 18 and 24

Q5 $\frac{7}{8} - \frac{3}{8}$

Q6 $6 + 2 \times (-3)$

Intentional retrieval feedback

Q1 $\frac{5}{12}$; Q2 2; Q3 $\frac{1}{2}$; Q4 6; Q5 $\frac{1}{2}$; Q6 0. Correct and retry tomorrow, then in one week.

Prove independently and improve

P1–P2: five minutes without notes; 4 marks. Your teacher reviews explanations and method marks.
P3 has no mark.

P1

Repair $2/3 + 1/4 = 3/7$ and show the common denominator. [2]

P2

Find $(3/4) \div (3/8)$ and give a multiplication check. [2]

P3

Name one decision you can now explain. Set a fresh question and a date for checking it without support.

Teacher feedback: _____

Fresh question and retry date: _____

Delayed independent evidence: _____

Prepare for the next lesson

L009: Fractions decimals and percentages

F1

Tomorrow find HCF of 18 and 24 and calculate $5/6 - 1/3$.

F2

Before L009, write $1/2$ and $1/4$ as decimals. Explain how division helps.

Read and prepare

Percent means per hundred. Fractions, decimals and percentages can name the same proportion. We will preserve the value while changing the representation.

Digital workbook: save locally where available; export a JSON backup before closing or moving the file. Restore only this lesson/version. Printing records answers, not mastery. Live browser checks remain pending; use Word/PDF if required.

Optional extension activities

Stretch

Without notes, calculate $\frac{7}{12} + \frac{5}{18}$ and explain the common denominator.

Deep challenge

Is $\frac{2}{3} + \frac{3}{4}$ greater than 1? Show a method without decimals.

Recall & Review: feedback and extension integration

Source-integrated WWW/EBI and extension page

Lesson L008: Fraction reasoning and retrieval

Objective: Select, explain and check fraction methods; diagnose misconceptions and transfer a repaired method to a fresh problem.

Timing for a 60-minute lesson

0-7 Connect & Check; 7-14 Share; 14-25 Present/model; 25-44 Apply route choice/practice; 44-52 independent exam-style check; 52-60 Recall & Review, WWW/EBI and next step.

Recall & Review evidence

At the end of the lesson, solve a fresh question without prompts, explain a check, correct one error and record the next practice step.

What Went Well (WWW)

I selected a suitable representation or multiplier and kept the reference amount clear.

Even Better If (EBI)

I will state the whole/part, show each operation and check that the size of my answer is reasonable.

Integrated stretch and deep challenge

Stretch: Without notes, calculate $7/12 + 5/18$ and explain the common denominator.

Deep challenge: Is $2/3 + 3/4$ greater than 1? Show a method without decimals.

My next-step response
