

Proportion problems and repair

Pearson Edexcel GCSE Mathematics 1MA1 • L016
Foundation and Higher • 60 minutes • Lesson resources

REACH FOR THE STAR | GCSE MATHEMATICS

Select and justify a proportion method. Diagnose whether the given amount is a total, a share or a difference.

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

Corresponding: quantities in matching roles. Total: sum of all shares. Difference: larger share minus smaller share. Direct proportion: constant ratio of corresponding quantities.

R1

Share 40 in the ratio 3:5.

R2

Four servings use 200 g. Find the amount for six servings.

R3

Find £/kg for 500 g costing £2.50.

Share | In pairs, predict the first step for this problem: For $A:B=2:3$, the whole contains five equal parts but the difference contains one part. The number of parts depends on what the given amount describes. In direct proportion, multipl Compare your reasons before using the worked model.

Present through worked examples

For $A:B=2:3$, the whole contains five equal parts but the difference contains one part. The number of parts depends on what the given amount describes. In direct proportion, multiplying one quantity by a factor multiplies the other by the same factor.

D1

Model: total 35 shared 2:5 gives parts of 5, hence 10 and 25. Now share 56 in ratio 3:4.

D2

Model: $A:B=2:5$ and $B=30$ gives one part 6, so $A=12$. Now $A:B=3:7$ and $A=15$. Find B.

D3

Model: $A:B=2:5$ and $B-A=12$ gives one part 4. Now $A:B=3:5$ and $B-A=14$. Find both.

D4

Model: 4 servings need 300 g; 10 need 750 g. Now 6 servings need 450 g. Find the amount for 8.

Apply with less support

Label the ratio parts and the meaning of the known amount. Find one part or one unit; scale to the target. Check the original ratio and the stated total or difference.

A1

For $A:B=2:3$, find A when (i) total=40 (ii) $B=30$ (iii) $B-A=8$. Explain the different divisors.

A2

Share £72 in ratio 5:4. Then find both shares for 5:4 when their difference is £12.

A3

A drink uses syrup:water=1:4. Make 1.5 litres. You have 250 ml syrup. Is it enough? Explain.

Optional support: Label total, share or difference.

Optional check after A3: $1500 \div 5 = 300$ and $300 + 1200 = 1500$. The sum check is necessary but also check syrup:water=1:4.

Apply and extend reasoning

C1

$A:B=2:3$ and $B:C=4:5$. Can you write $A:C=2:5$? Repair the claim.

C2

A recipe is doubled but only the flour is doubled. Is it the same recipe? Explain using a ratio example.

Intentional practice feedback — read after attempting

A1: 16; 20; 16.

A2: £40 and £32; £60 and £48.

A3: Need 300 ml syrup and 1200 ml water; short by 50 ml.

C1: No. Match B to 12: $A:B:C=8:12:15$, so $A:C=8:15$.

C2: No in general. Flour:sugar 2:1 becomes 4:1 rather than 4:2.

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 First share: 56 in ratio 3:4

Q2 $A:B=3:7$, $A=15$. Find B.

Q3 $A:B=3:5$, difference 14. Find A.

Q4 Grams for 8 if 6 need 450

Q5 Millilitres in 1.5 litres

Q6 £/kg for 250 g costing £1.20

Intentional retrieval feedback

Q1 24; Q2 35; Q3 21; Q4 600; Q5 1500; Q6 4.8. 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

$A:B=4:7$ and $B-A=18$. Find A and B with a method. [2]

P2

Five servings need 350 g. Find the amount for eight, showing a method. [2]

P3

Explain one corrected error. Set a fresh question and a date to check it without support.

Teacher feedback: _____

Fresh question and retry date: _____

Delayed independent evidence: _____

Prepare for the next lesson

L017: Algebraic language and substitution

F1

Tomorrow solve $A:B=2:5$ with total 63, then with difference 15.

F2

Before L017, calculate $3 \times 4 + 2$ and $3 \times (4 + 2)$. Why are the results different?

Read and prepare

An algebraic expression records a calculation with a letter representing a number. For $x=4$, $3x+2$ means $3 \times 4 + 2$, while $3(x+2)$ means $3 \times (4 + 2)$.

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

Four workers complete a job in 15 hours at constant rate. How long would six workers take?

Deep challenge

Explain why doubling workers may fail to halve time in a real job.

Recall & Review: feedback and extension integration

Source-integrated WWW/EBI and extension page

Lesson L016: Proportion problems and repair

Objective: Select and justify a proportion method. Diagnose whether the given amount is a total, a share or a difference.

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: Four workers complete a job in 15 hours at constant rate. How long would six workers take?

Deep challenge: Explain why doubling workers may fail to halve time in a real job.

My next-step response
