

Equations in contexts

Pearson Edexcel GCSE Mathematics 1MA1 • L020
Foundation and Higher • 60 minutes • Lesson resources

REACH FOR THE STAR | GCSE MATHEMATICS

Translate a context into a linear equation, solve it and interpret the result with appropriate units and constraints.

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

Model: mathematical representation of a situation. Unknown: quantity to find. Constraint: condition the answer must satisfy. Interpret: state what a numerical result means in context.

R1

Solve $3x+2=17$.

R2

Simplify $2(x+4)+2x$.

R3

Find the perimeter of a 7 cm by 3 cm rectangle.

Share | In pairs, predict the first step for this problem: An equation links two descriptions of the same quantity. If tickets cost £4 each plus a £3 fee and the bill is £23, $4n+3=23$ models the bill. Solving gives $n=5$ tickets. The unit and Compare your reasons before using the worked model.

Present through worked examples

An equation links two descriptions of the same quantity. If tickets cost £4 each plus a £3 fee and the bill is £23, $4n+3=23$ models the bill. Solving gives $n=5$ tickets. The unit and any whole-number requirement matter.

D1

Model: £4 tickets plus £3 fee total £23: $4n+3=23$, $n=5$. Now £5 tickets plus £2 fee total £32. Find n .

D2

Model: two consecutive integers are n and $n+1$. Their sum 15 gives $2n+1=15$. Find consecutive integers summing to 23.

D3

Model: rectangle sides x and $x+3$ cm, perimeter 26 cm: $4x+6=26$, $x=5$. Now perimeter 34 cm. Find both sides.

D4

Model: A costs $5+2n$, B costs $3n$ pounds. Equal cost gives $n=5$. Now A costs $8+2n$ and B costs $4n$. Find equality.

Apply with less support

Define the unknown with units. Translate each relationship, keeping one-off charges separate. Solve using balanced operations. Substitute and check the result against the context.

A1

Form and solve: a number plus 6 is 20; six times a number is 30; six less than twice a number is 20.

A2

A rectangle is x cm wide and $x+5$ cm long. Perimeter is 42 cm. Find both dimensions.

A3

A club charges £6 joining fee plus £3 per visit. A bill is £27. Find the number of visits and check.

Optional support: Underline the operation words.

Optional check after C2: enter $10+2\times 8$ and 4×8 . Expect 26 and 32. Check that the calculator expression matches the written cost model.

Apply and extend reasoning

C1

Can two consecutive whole numbers sum to 30? Use an equation to explain.

C2

Plan A costs £10+£2 per visit; B costs £4 per visit. When are costs equal, and which is cheaper for 8 visits?

Intentional practice feedback — read after attempting

A1: $x+6=20$, $x=14$; $6x=30$, $x=5$; $2x-6=20$, $x=13$.

A2: Width 8 cm; length 13 cm.

A3: 7 visits; $6+3\times 7=27$.

C1: No. $2n+1=30$ gives $n=14.5$, not a whole number.

C2: Equal at 5 visits (£20). At 8, A £26 and B £32, so A.

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 Solve $4n+3=23$

Q2 Smaller consecutive integer: total 23

Q3 x if $4x+6=34$

Q4 Solve $8+2n=4n$

Q5 Visits: $6+3v=27$

Q6 20% of 45

Intentional retrieval feedback

Q1 5; Q2 11; Q3 7; Q4 4; Q5 7; Q6 9. 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 £4 fee plus £2 per item gives £18. Form an equation and find the number of items. [2]

P2

Consecutive integers total 35. Form an equation and find both. [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

L021: Formulae and rearranging

F1

Tomorrow find visits for a £5 fee plus £4 per visit totalling £29.

F2

Before L021, in $C=3n+4$, explain which letter is already the subject.

Read and prepare

A formula links quantities. The subject is the letter isolated on one side. To make n the subject of $C=3n+4$, subtract 4 from both sides then divide by 3: $n=(C-4)/3$.

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

Allow 10–15 minutes for learners who have secured the main practice. Show a method, explain a check and justify your conclusion.

Stretch

A taxi charges £3.50 plus £1.80 per mile. Find miles travelled for a £21.50 fare.

Deep challenge

A rectangle's perimeter is 38 cm and its length is 3 cm more than width. Find dimensions.

Recall & Review: feedback and extension integration

Lesson L020: Equations in contexts

Objective: Translate a context into a linear equation, solve it and interpret the result with appropriate units and constraints.

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 one check, correct one error and record the next practice step.

What Went Well (WWW)

I represented the algebraic structure accurately, kept each transformation valid and checked the result by substitution, graph or equivalent reasoning.

Even Better If (EBI)

I will show the missing inverse operation or algebraic step, keep signs and brackets accurate and test the result in the original relationship.

Integrated stretch and deep challenge

Stretch: A taxi charges £3.50 plus £1.80 per mile. Find miles travelled for a £21.50 fare.

Deep challenge: A rectangle's perimeter is 38 cm and its length is 3 cm more than width. Find dimensions.

My next-step response
