

Teacher guide and workbook answers

Pearson Edexcel GCSE Mathematics 1MA1 • L017

60 minutes • Foundation and Higher • Teacher use only • Lesson resources

REACH FOR THE STAR | GCSE MATHEMATICS

Purpose and prerequisites

Read algebraic notation accurately. Substitute signed values and distinguish expressions, equations and identities.

Signed arithmetic, operation priority and powers from L001–L004; brackets from L016 preparation.

Selected specification content: A1 A2 A3. These lessons revisit shared content; they do not complete every aspect of those statements.

Preparation and support

Prepare mini-whiteboards, printed fallbacks and a teacher calculator. Use ratio tables, algebra tiles, balance diagrams and number lines as appropriate. Confirm save/export/restore in the intended environment; browser QA remains pending. Distribute only the learner package.

Access: pre-teach vocabulary and read symbols aloud. Scaffold: model the first decision, offer a worked-example or inverse-check frame. Core: remove prompts for A2 and P1–P2. Stretch: C1–C2 deepen reasoning for either tier. Record the support used, not a fixed ability label.

Evidence and pacing

The delivery map totals 60 minutes. Use the recall and hinge to select a repair; the suggested one-third error trigger is a planning judgement, not a validated threshold. If errors are widespread, use two minutes from independent practice and defer C2. P1–P2 need teacher marking. The mini-test and exam practice are delayed/additional activities, not extra tasks squeezed into the hour.

For $x = -2$, x^2 is A -4 , B 4 , C -2 . Answer B: $(-2) \times (-2) = 4$.

Recall and guided-practice answers

R1

14. Multiply before adding.

R2

9. Two negative factors.

R3

5. Divide before adding.

D1

$-10. 5 \times (-2).$

D2

$-7. 3 \times (-3) + 2 = -9 + 2.$

D3

9 and -9 . The leading minus is outside the square.

D4

Identity: equal for every x . Distribution gives $2x+6$.

Application and challenge answers

A1

6,5,4; $-6,1,4$. The square stays equal for opposite values.

A2

-13 ; -6 . $2 \times (-2) - 3 \times 3$; $(-2) \times 3$.

A3

£18. Fixed charge £4 and distance cost £14. $4 + 2 \times 7$; model assumes that tariff applies.

C1

No: $x=3$ gives 9 versus 6. They agree at $x=0$ or $x=2$. Agreement at one value does not prove an identity.

C2

2 is not $1/2$. Division is not commutative. The divisor and dividend have different roles.

Calculator guidance: Optional check: enter $(-3)^2$ and then $-(3^2)$. Expect 9 and -9 . Calculator models differ in negative-key precedence; use explicit brackets.

Independent evidence and next steps

P1

$4 \times (-2) - 1$ M1; -9 A1. Brackets protect the negative sign.

P2

$(-3)^2 + 2 \times 4$ M1; 17 A1. Square before addition.

P3

Individual reflection. Record support and delayed evidence; completion is not mastery.

F1

-1 ; 16 . Substitute independently.

F2

There are five identical groups. Only like groups are collected.

Retrieval answers: 12 , -7 , 9 , -9 , 8 , 15 . Exact signed decimals/fractions/mixed numbers are accepted; unsupported notation goes to review. No automatic method marks. For rounding, equivalent numerical values may pass retrieval; the teacher checks stated accuracy and required trailing zeros in written work.

Reteaching and release

If $3x$ is read as $3+x$, use three equal groups. If a negative square is negative, write both factors. Recheck $x = -3$ in $2x+5$ and x^2 : -1 and 9 .

Practice feedback is intentionally visible. Full assessment answers, this guide and delivery notes are teacher-only. Local saving is browser dependent; no account service is included. Completed resources enter Review; human approval and outstanding browser checks remain required.

Optional extension answers

Stretch

If $a = -2$ and $b = 5$, evaluate $3a^2 - 2b$ and $2(a+b)$.

Answer and reasoning: $12 - 10 = 2$; $2 \times 3 = 6$.

Deep challenge

A learner interprets $3x^2$ as $(3x)^2$. Use $x = 2$ to expose the error.

Answer and reasoning: $3x^2 = 12$ while $(3x)^2 = 36$.

Activate Learning lesson cycle

Connect & Check: state the objective and diagnose prior knowledge. Share: pairs predict and compare methods. Present: explain or uncover the model. Apply: fade support for independent practice and optional stretch. Recall & Review: use a fresh question and feedback to decide the next step.

Recall & Review: feedback and extension integration

Source-integrated WWW/EBI and extension page

Lesson L017: Algebraic language and substitution

Objective: Read algebraic notation accurately. Substitute signed values and distinguish expressions, equations and identities.

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 wrote the algebraic structure accurately and used a valid step-by-step method.

Even Better If (EBI)

I will show inverse operations clearly, keep signs/brackets accurate and substitute back to check.

Integrated stretch and deep challenge

Stretch: If $a=-2$ and $b=5$, evaluate $3a^2-2b$ and $2(a+b)$.

Deep challenge: A learner interprets $3x^2$ as $(3x)^2$. Use $x=2$ to expose the error.

Teacher use

Use the WWW/EBI prompts to write mathematics-specific feedback linked to the objective. Do not accept generic praise; feedback should identify the method, representation, reasoning or checking step that improved, then set a fresh next-step question.

Assessment evidence to inspect: Check the formative mini-test and independent workbook response against the objective. Use the teacher answers or mark guidance; group errors for reteaching. Non-calculator core; optional calculator check.