

Teacher guide and workbook answers

Pearson Edexcel GCSE Mathematics 1MA1 • L022

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

REACH FOR THE STAR | GCSE MATHEMATICS

Purpose and prerequisites

Solve linear inequalities and represent solution sets on number lines. Explain endpoint inclusion and order reversal.

L019 balanced equation methods; signed-number ordering and L021 inverse operations.

Selected specification content: A3 A22. 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 $x \leq 3$, is 3 included? A yes, B no. Answer A: equality is allowed, so draw a filled circle.

Recall and guided-practice answers

R1

–2. Further right on the number line.

R2

$x=4$. Equation boundary method.

R3

3. Two negative signs give a positive quotient.

D1

Filled circle at -1 ; ray to the right. -1 is included, and all greater values.

D2

$x \geq 5$. Add 3 on both sides.

D3

$x > 4$. Add 2, divide by positive 3.

D4

$x \leq -4$. Division by -3 reverses the sign.

Application and challenge answers

A1

Open left; filled left; open right; filled right. Strictness and direction are separate choices.

A2

$x \leq 4$; 1,2,3,4. The integer condition narrows the real solution set.

A3

$5 + 3v \leq 20$; $v \leq 5$; maximum 5 visits. At most includes equality.

C1

$x = 0$ fits the original but not the claim. Correct $x \geq -4$. Division by a negative reverses order.

C2

-1,0,1,2,3. -2 is excluded; 3 is included.

Calculator guidance: Optional numerical check for $-3x \geq 12$: $x = -5$ gives $15 \geq 12$, while $x = 0$ gives $0 \geq 12$ false. A calculator tests selected values; it does not describe the full set.

Independent evidence and next steps

P1

$x < 4$ B1; open circle at 4 and ray left B1. Both endpoint and direction required.

P2

$x \geq -3$ B1; division by negative reverses order B1. Check a value such as 0.

P3

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

F1

$x \leq 4$; 0,1,2,3,4. Include zero.

F2

17,20; add 3 each time. Position-to-term rules will avoid repeated addition.

Retrieval answers: 5, 4, -4, 3, 5, 5. 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 only the boundary is reported, ask for two solutions. If $\leq$ is drawn open, test the endpoint. If negative division is missed, compare -2 and -5 . Recheck $-2x < 6$ as $x > -3$.

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 activities

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

Stretch

Solve $3 - 2x < 11$ and show the solution in words.

Answer and reasoning: $-2x < 8$, so $x > -4$; all numbers greater than -4 .

Deep challenge

Why does dividing $-3x \geq 12$ by -3 reverse the sign? Give a numerical check.

Answer and reasoning: $x \leq -4$; multiplying an inequality by a negative reverses order, e.g. $-3 \times -4 = 12$ and $x = -5$ gives $15 \geq 12$.

Ask for a fresh independent explanation before deciding that the method is secure.

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

Lesson L022: Inequalities and number lines

Objective: Solve linear inequalities and represent solution sets on number lines. Explain endpoint inclusion and order reversal.

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: Solve $3 - 2x < 11$ and show the solution in words.

Deep challenge: Why does dividing $-3x \geq 12$ by -3 reverse the sign? Give a numerical check.

Teacher use

Use the What Went Well (WWW) and Even Better If (EBI) prompts to write mathematics-specific feedback linked to the objective. Do not accept generic praise: 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.