

Teacher guide and workbook answers

Pearson Edexcel GCSE Mathematics 1MA1 • L034

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

REACH FOR THE STAR | GCSE MATHEMATICS

Purpose and prerequisites

Calculate circle circumference and area, arc length and sector area, distinguishing curved length from the full sector perimeter.

L033 perimeter/area and square units; fractions of amounts; radius and diameter.

Selected specification content: G9 G17 G18. 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. Prepare rulers, compasses, protractors, tracing paper and the practical drawing sheets. Drawings and constructions require teacher review. 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.

A quarter-circle sector has $r=4$ cm. Its perimeter is A 2π , B $2\pi+8$, C 4π cm. Answer B: arc plus two radii.

Recall and guided-practice answers

R1

10 cm. Twice radius.

R2

$\frac{1}{4}$. $90 \div 360$.

R3

36. 6×6 .

D1

10π cm. Use πd .

D2

16π cm². Radius 4; square it.

D3

4π cm. One third of 12π .

D4

12π cm²; $4\pi + 12$ cm. Area one third of 36π ; perimeter adds two radii.

Application and challenge answers

A1

8π , 4π , 2π cm. Whole, half, quarter.

A2

16π cm²; $4\pi+16$ cm. Quarter of area and circumference; add radii.

A3

31.4 m; 78.5 m². 10π and 25π ; round only final values.

C1

Circumference doubles; area quadruples because $(2r)^2=4r^2$. Use formulas or a counterexample.

C2

3π is curved arc only; include diameter 6, total $3\pi+6$ m. Trace the closed boundary.

Calculator guidance: Calculator required for A3 only; other tasks use exact π forms. Enter $10\times\pi$ and $\pi\times 5^2$, retaining full precision until rounding to 1 decimal place. Numeric retrieval asks for coefficients of π , not the full symbolic answer.

Independent evidence and next steps

P1

$(60/360) \times 36\pi$ M1; $6\pi \text{ cm}^2$ A1. One sixth of circle.

P2

Arc $3\pi \text{ cm}$ M1; $3\pi + 12 \text{ cm}$ A1. Add two radii.

P3

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

F1

$10\pi \text{ cm}$; $25\pi \text{ cm}^2$. Different units and powers.

F2

60 cm^3 . Area times length.

Retrieval answers: 14, 9, $1/3$, 25, 12, 4. 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 diameter is squared in πr^2 , halve it first. If a sector perimeter equals just its arc, trace both straight edges. If $\theta/180$ is used, compare a semicircle with the full 360° . Recheck $r=6$, $\theta=90^\circ$.

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

A sector has radius 9 cm and angle 80° . Find arc length and area exactly.

Answer and reasoning: $\text{Arc} = 80/360 \times 18\pi = 4\pi$ cm; $\text{area} = 80/360 \times 81\pi = 18\pi$ cm².

Deep challenge

A learner finds the perimeter of a semicircle of radius 5 cm as 5π cm. Explain the missing part.

Answer and reasoning: 5π is curved arc only; full perimeter includes diameter 10, so $5\pi + 10$ cm.

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 L034: Circles arcs and sectors

Objective: Calculate circle circumference and area, arc length and sector area, distinguishing curved length from the full sector perimeter.

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 selected the correct geometric fact, theorem, formula or transformation and used a clear diagram with appropriate labels and units.

Even Better If (EBI)

I will name the fact or theorem, show the substitution or construction step and check whether the size, direction and units of the result are reasonable.

Integrated stretch and deep challenge

Stretch: A sector has radius 9 cm and angle 80° . Find arc length and area exactly.

Deep challenge: A learner finds the perimeter of a semicircle of radius 5 cm as 5π cm. Explain the missing part.

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. Calculator required for A3 only; other tasks use exact π forms. Enter $10 \times \pi$ and $\pi \times 5^2$, retaining full precision until rounding to 1 decimal place. Numeric retrieval asks for coefficients of π , not the full symbolic answer..