

Circles arcs and sectors

Pearson Edexcel GCSE Mathematics 1MA1

L034 • Geometry and measures

60 minute lesson | learner resources

The goal and the evidence

Connect & Check → Share → Present → Apply → Recall & Review

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

Explain, apply and check independently.

Starting-point diagnostic

R1–R3 • Attempt without notes

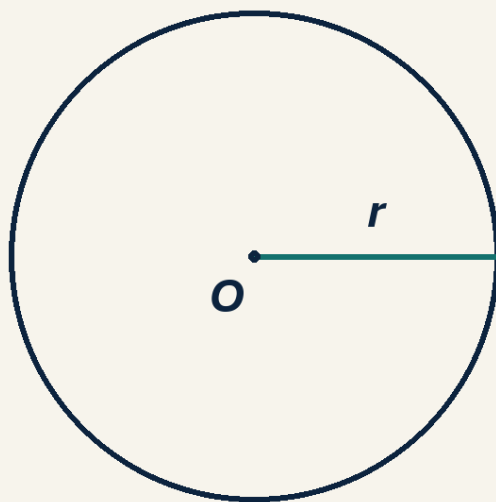
Radius 5 cm: find diameter.

What fraction of a full turn is 90° ?

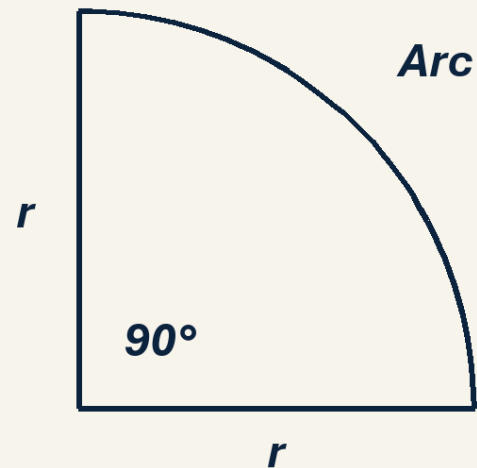
Find 6^2 .

See the geometry

Use the diagram and practical sheet.



Teaching sketch • not to scale



Sector boundary = arc + 2r

Worked example and your turn

D1 • Explain each step

Model: $r=3$ gives $C=6\pi$ cm. Now diameter=10 cm; give exact circumference.

Try the paired problem; check independently.

Worked example and your turn

D2 • Explain each step

Model: $r=3$ gives area $9\pi \text{ cm}^2$. Now diameter=8 cm; give exact area.

Try the paired problem; check independently.

Worked example and your turn

D3 • Explain each step

Model: $r=6$, $\theta=90^\circ$ gives arc $(1/4) \times 12\pi = 3\pi$ cm. Now $r=6$, $\theta=120^\circ$.

Try the paired problem; check independently.

Worked example and your turn

D4 • Explain each step

Model: $r=6$, $\theta=90^\circ$ gives area $9\pi \text{ cm}^2$. Now $r=6$, $\theta=120^\circ$; find sector area and perimeter.

Try the paired problem; check independently.

A method you can explain

Name the fact or construction at each step.

Check against the original question.

Diagnostic pause

Choose and explain before moving on.

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

Use your explanation to decide the next step.

Careful variation

A1 • Show your reasoning

For $r=4$ cm, find circumference, semicircle arc and quarter-circle arc exactly.

Explain your decisions and check the result.

Independent application

A2 • Show your reasoning

A sector has $r=8$ cm and $\theta=90^\circ$. Find area and perimeter exactly.

Explain your decisions and check the result.

Use the method in context

A3 • Show your reasoning

A circular pond has diameter 10 m. Find fencing for the whole edge, to 1 decimal place, and area to 1 decimal place.

Explain your decisions and check the result.

Intentional practice feedback

Read after attempting A3

31.4 m; 78.5 m².

Correct one step and explain the change.

A claim to test

C1 • Show your reasoning

Doubling radius doubles both circumference and area. Assess the claim.

Explain your decisions and check the result.

Deepen the reasoning

C2 • Show your reasoning

A semicircular garden of radius 3 m needs a fence round its full boundary. Explain why 3π m is insufficient.

Explain your decisions and check the result.

Retrieval without notes

Q1–Q3 • Numeric answers

Diameter for radius 7 cm

Radius for diameter 18 cm

Fraction of full circle for 120°

Retrieval without notes

Q4–Q6 • Numeric answers

Coefficient of π in area for $r=5$

Coefficient of π in circumference for $d=12$

Coefficient of π in quarter arc for $r=8$

Independent exit evidence

P1 • Without notes • Teacher review

Find sector area for $r=6$ cm and angle 60° , exactly.
Show method. [2]

Show working and check your answer.

Independent exit evidence

P2 • Without notes • Teacher review

Find perimeter of a quarter-circle sector with radius 6 cm, exactly. [2]

Show working and check your answer.

Feedback and next steps

P3 • Completion is not mastery

Explain one error you have corrected.

Set a fresh question and a delayed check.

Before the next lesson

L035: Prisms and cylinders

Complete F1 tomorrow without notes.

Attempt F2 and bring one question.

Optional stretch

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

Show a method. Explain a check or counterexample.

Optional deep challenge

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

Show a method. Explain a check or counterexample.

L034 Recall & Review

Circles arcs and sectors



Fresh evidence: prove the objective

Solve a new question without prompts. Explain one check, then correct one error in your working.

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

Write the next practice step before you leave. It must test the method again, not simply copy today's example.

Feedback language

Use the full phrases before the abbreviations.

What Went Well (WWW)

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

Identify the mathematical method, representation, reasoning or check that improved.

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.

Set one precise next-step action and test it on a fresh question.

Extension route

Choose this route only after the core evidence is secure.

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.

Explain your reasoning clearly enough that another learner could check it.