PEARSON EDEXCEL INTERNATIONAL GCSE MATHEMATICS A (4MA1) · HIGHER TIER

Circles, Arcs and Sectors: exam questions

10 questions · 26 marks · mark schemes at the end

Name _____ Date _____ Score / 26

- Calculators are allowed on both 4MA1 Higher papers (1H and 2H). Show your working: most marks are for method.
- Mark schemes start after the questions. M marks are for a correct method, A marks for an accurate answer that follows a correct method, and B marks for a correct result on its own.
- Online, with more practice: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/circles-arcs-and-sectors

1. **2 marks**

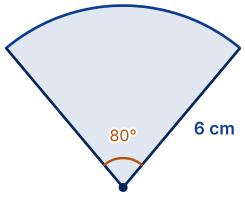
A circle has radius 6.5 cm.

Work out the circumference of the circle.

2. **2 marks**

A sector of a circle has radius 6 cm and angle $80°$.

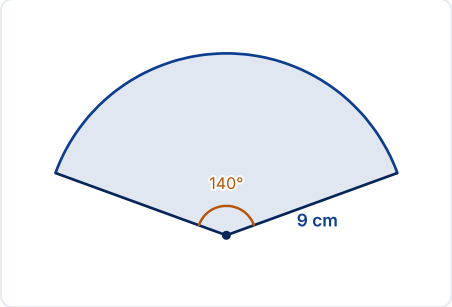
Work out the area of the sector. Give your answer in terms of π.



3. **2 marks**

A sector of a circle has radius 9 cm and angle $140°$.

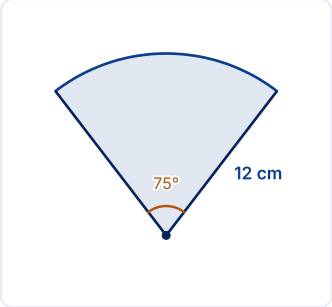
Work out the arc length of the sector.



4. **2 marks**

A sector of a circle has radius 12 cm and angle $75°$.

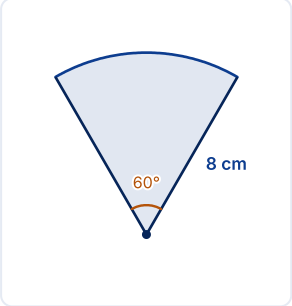
Work out the area of the sector.



5. **3 marks**

A sector of a circle has radius 8 cm and angle $60°$.

Work out the perimeter of the sector.



6. **3 marks**

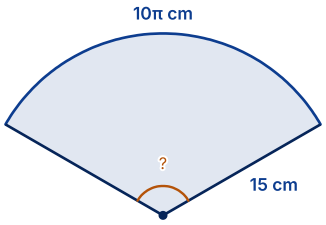
A semicircle has an area of 50 cm².

Work out its radius.

7. **3 marks**

A sector of a circle of radius 15 cm has an arc length of 10π cm.

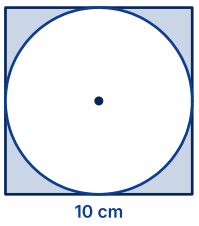
Work out the angle of the sector.



8. **3 marks**

A circle fits exactly inside a square of side 10 cm, touching all four sides.

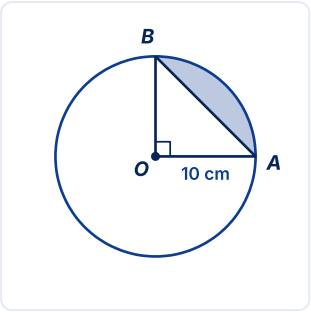
Work out the area of the square that is outside the circle.



9. **3 marks**

A chord AB of a circle, centre O, radius 10 cm, makes a right angle at O.

Work out the area of the minor segment cut off by AB.



10. **3 marks**

A bicycle wheel has a diameter of 70 cm.

How many complete turns does the wheel make when the bicycle travels 1 km?

Answers and worked solutions

Question 1 — 2 marks

M1 $2 \times \pi \times 6.5$

A1 40.8 cm

Answer: 40.8 cm

Question 2 — 2 marks

M1 $\frac{80}{360} \times \pi \times 6^2$

A1 $8\pi \text{ cm}^2$

Answer: $8\pi \text{ cm}^2$

Question 3 — 2 marks

M1 $\frac{140}{360} \times 2 \times \pi \times 9$

A1 22.0 cm

Answer: 22.0 cm

Question 4 — 2 marks

M1 $\frac{75}{360} \times \pi \times 12^2$

A1 94.2 cm^2

Answer: 94.2 cm^2

Question 5 — 3 marks

M1 arc $\frac{60}{360} \times 2 \times \pi \times 8 = 8.37\ldots$

M1 $8.37\ldots + 8 + 8$

A1 24.4 cm

Answer: 24.4 cm

Question 6 — 3 marks

M1 $\frac{1}{2}\pi r^2 = 50$

M1 $r^2 = \frac{100}{\pi}$

A1 5.64 cm

Answer: 5.64 cm

Question 7 — 3 marks

M1 $\frac{\theta}{360} \times 2\pi \times 15 = 10\pi$

M1 $\theta = \frac{10 \times 360}{30}$

A1 $120°$

Answer: $120°$

Question 8 — 3 marks

M1 radius 5 cm

M1 $100 - \pi \times 5^2$

A1 21.5 cm^2

Answer: 21.5 cm^2

Question 9 — 3 marks

M1 sector $\frac{1}{4} \times \pi \times 10^2 = 78.5\ldots$

M1 triangle $\frac{1}{2} \times 10 \times 10 = 50$

A1 28.5 cm^2

Answer: 28.5 cm^2

Question 10 — 3 marks

M1 circumference $70\pi = 219.9\ldots$ cm

M1 $100\,000 \div 219.9\ldots = 454.7\ldots$

A1 454

Answer: 454

Online, with every solution: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/circles-arcs-and-sectors
Our own original questions, written and checked by IGCSE Math Revision. Independent, not affiliated with Pearson Edexcel.