Your notes

GCSE Maths: revision notes

Circles, arcs and sectors

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Parts of a circle

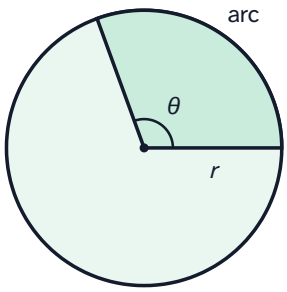
- The **radius** goes from the centre to the edge. The **diameter** goes right across through the centre and is twice the **radius**. The circumference is the distance around the circle.
- A **chord** joins two points on the circle. A tangent touches the circle at one point. An arc is part of the **circumference**.
- A **sector** is a 'slice' between two radii. A **segment** is the region between a **chord** and an arc.

Circumference and area

- **Circumference** = $\pi d = 2\pi r$. Area = πr^2.
- A circle with **radius** 5 cm has a **circumference** of $10\pi = 31.4$ cm and an area of $25\pi = 78.5$ cm^2 (1 d.p.).
- 'Give your answer in terms of π' means leave π in the answer, such as 25π cm^2.

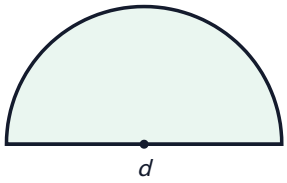
Arcs and sectors

- A **sector** with angle θ is $\theta/360$ of the whole circle.
- Arc length = $\theta/360 \times 2\pi r$. **Sector** area = $\theta/360 \times \pi r^2$.
- A 90° **sector** of **radius** 6 cm has an area of $\frac{1}{4} \times 36\pi = 9\pi = 28.3$ cm^2 and an arc length of $\frac{1}{4} \times 12\pi = 3\pi = 9.42$ cm.



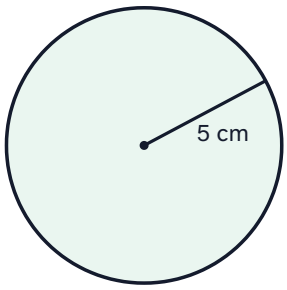
Semicircles and perimeters

- The perimeter of a semicircle is half the **circumference** plus the **diameter**. With **radius** 4 cm: 4π + 8 = 20.6 cm.
- The perimeter of a **sector** is the arc length plus two radii.



Worked examples

A circle has a radius of 5 cm. Find its area and circumference to 1 decimal place.



Area = πr^2. **$\pi \times 5^2 = 25\pi = 78.539...$**

Circumference = $2\pi r$ (or πd). **$2 \times \pi \times 5 = 10\pi = 31.415...$**

Answer: Area 78.5 cm², circumference 31.4 cm

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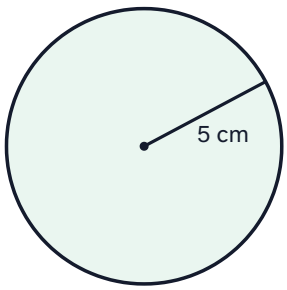
Key terms

Radius	The distance from the centre of a circle to its edge.
Diameter	The distance across a circle through its centre; twice the radius.
Circumference	The distance around a circle.
Chord	A straight line joining two points on a circle.
Arc	Part of the circumference of a circle.
Sector	The region between two radii and an arc, like a slice of pizza.
Segment	The region between a chord and an arc.
π (pi)	The circumference of any circle divided by its diameter, about 3.14159.

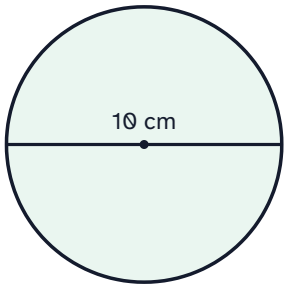
Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. A circle has a radius of 5 cm. What is its diameter?

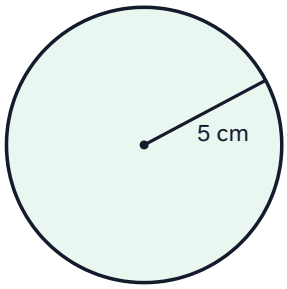


2. What is the formula for the area of a circle?
3. What is the circumference of a circle with diameter 10 cm, to 1 d.p.?



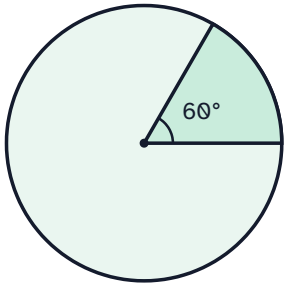
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4. What is the area of a circle with radius 5 cm, to 1 d.p.?

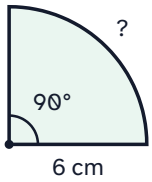


5. What does 'give your answer in terms of π' mean?

6. What fraction of a circle is a sector with an angle of 60°?

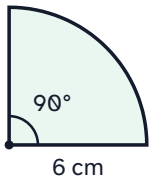


7. What is the arc length of a 90° sector of radius 6 cm, to 2 d.p.?



Your notes

8. What is the area of a 90° sector of radius 6 cm, to 1 d.p.?



Your notes

Answers

1. 10 cm
2. πr^2
3. 31.4 cm
4. 78.5 cm^2
5. Leave π in the answer instead of using its value
6. 1/6
7. 9.42 cm
8. 28.3 cm^2

What to do next

Practise 12 questions on this topic

Try 7 exam questions, with mark schemes

Read the lesson, one step at a time

Free revision for GCSE and KS3 at lycolearn.co.uk. Some notes are for one exam board only, and say so in brackets.