

Arcs Sectors

GCSE Maths · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Find the arc length of a sector with radius 6 cm and angle 60° .

Step 1 · Fraction of the circle

$$60/360 = 1/6$$

Step 2 · Circumference

$$2\pi \times 6 = 12\pi$$

Step 3 · Arc

$$1/6 \times 12\pi = 2\pi$$

Answer: 2π cm $\approx$ 6.28 cm

Check: Six of these arcs make the whole 12π circumference ✓

2. Now try one with the steps

Find the area of a sector with radius 9 cm and angle 80° .

Step 1 · Area of the full circle

Step 2 · Fraction

Step 3 · Sector area

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

- 1.** Find the arc length of a sector with radius 5 cm and angle 90° , to 2 decimal places. [2]

- 2.** Find the area of a sector with radius 4 cm and angle 90° , to 2 decimal places. [2]

- 3.** Find the arc length of a sector with radius 12 cm and angle 30° , in terms of π . [2]

4. Find the area of a sector with radius 6 cm and angle 120° , in terms of π . [2]

5. Find the perimeter of a semicircle with diameter 10 cm, to 2 decimal places. [2]

6. Find the area of a sector with radius 8 cm and angle 45° , to 2 decimal places. [2]

7. Find the perimeter of a sector with radius 6 cm and angle 150° , to 2 decimal places. [3]

8. A sector of radius 9 cm has arc length 3π cm. Find its angle. [3]

9. A sector with angle 60° has area 24π cm². Find its radius, in cm. [3]

10. A sector of radius 8 cm has arc length 10 cm. Find its angle, to 1 decimal place. [3]

11. A pizza of radius 15 cm is cut into 8 equal slices. Find the area of one slice, to 1 decimal place. [2]

12. The minute hand of a clock is 12 cm long. How far does its tip travel in 20 minutes, to 1 decimal place? [3]

13. A quarter circle has radius 10 cm. The two radii and the chord joining their ends make a triangle. [3]
Find the area between the chord and the arc, to 1 decimal place.

14. A paper fan opens to a sector of radius 20 cm and angle 110° . Find its area to the nearest cm^2 . [2]

15. A sector of radius 9 cm has a perimeter of 30 cm. Find its angle, to 1 decimal place. [4]

4. Before you hand it in

Arc length = $\frac{\theta}{360} \times \pi r^2$

Arc length is a length, so it comes from the circumference $2\pi r$. Area comes from πr^2 .

Using the diameter

Halve a given diameter first. A semicircle of diameter 10 cm has $r = 5$ cm.

Perimeter of a sector = arc length only

The perimeter goes all the way round: arc + radius + radius.

Area of a 60° sector of radius 6 = $\pi \times 36 \times \frac{60}{360}$

Multiply by the fraction of the circle, $\frac{60}{360} = \frac{1}{6}$: $6\pi \text{ cm}^2$.