

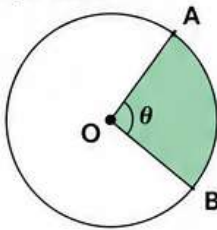


AREA OF SECTORS

AREAS RELATED TO CIRCLES

1 CHAPTER SNAPSHOT

- ✓ **DEFINITION:** A sector is the region enclosed by two radii and the arc between them.
- ✓ **KEY FINDING:** The area and arc length of a sector are directly proportional to the central angle (θ).
- ✓ **SUPPORTING FACT:**
 - Minor Sector : $\theta < 180^\circ$
 - Major Sector : $\theta > 180^\circ$
 - Semicircle : $\theta = 180^\circ$
 - Larger $\theta \Rightarrow$ Larger Sector $\Rightarrow$ Longer Arc



2 HIGH-YIELD CONCEPTS

- **Sector:** Region enclosed by two radii and an arc.
- **Central Angle (θ):** Angle formed at the centre.
- **Minor Sector:** Smaller region ($\theta < 180^\circ$).
- **Major Sector:** Larger region ($\theta > 180^\circ$).
- **Sector Area:** Fraction of the area of the whole circle.
- **Arc Length:** Fraction of the circumference.

KEY FINDING: Both sector area and arc length are obtained by multiplying the whole-circle formula by $\theta/360$.

SUPPORTING FACT: Always identify whether the required region is the major or minor sector before substituting values.

3 FORMULA BANK

WHOLE CIRCLE

- Area = πr^2
- Circumference = $2\pi r$

SECTOR (MINOR)

$$\text{Area of Sector} = \frac{\theta}{360} \times \pi r^2$$

$$\text{Arc Length} = \frac{\theta}{360} \times 2\pi r$$

MAJOR REGION

$$\text{Area of Major Sector} = \pi r^2 - \frac{\theta}{360} \pi r^2$$

$$\text{Length of Major Arc} = 2\pi r - \frac{\theta}{360} (2\pi r)$$

PROCESS: Solving Sector Problems

Radius (r) $\rightarrow$ Central Angle (θ) $\rightarrow$ Choose Formula $\rightarrow$ Substitute Values $\rightarrow$ Simplify & Write Units

4 BOARD EXAM FOCUS & QUESTION HOTSPOTS

- PROCESS_STEP:** Selecting the Correct Formula
 - Identify whether the question asks for area or arc length.
 - Note the values of radius (r) and central angle (θ).
 - Substitute the values into the appropriate formula.
- PROCESS_STEP:** Major Sector Problems
 - Find the minor sector first.
 - Use:
 - Major Sector = Whole Circle – Minor Sector
 - Major Arc = Circumference – Minor Arc
- EXAMPLE TYPE**
 - Find area of a sector when r and θ are given.
 - Find length of an arc for a given radius and central angle.
- KEY FINDING**

Frequently tested applications:

 - Area of Sector
 - Arc Length
 - Major Sector
 - Major Arc
 - Real-life Contexts (parks, pizza slices, fan blades, circular tracks)

5 SMART REVISION TIPS

KEY FINDING

- ✓ Write θ and r before substituting.
- ✓ Area $\rightarrow$ Square units (cm^2 , m^2)
- ✓ Arc Length $\rightarrow$ Linear units (cm, m)
- ✓ Major Sector = Whole Circle – Minor Sector
- ✓ Draw a neat labelled sector whenever possible.



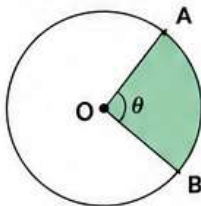
SUPPORTING FACT

If $\theta = 360^\circ \rightarrow$ Sector = Whole Circle
If $\theta = 180^\circ \rightarrow$ Sector = Semicircle

COMMON MISTAKES

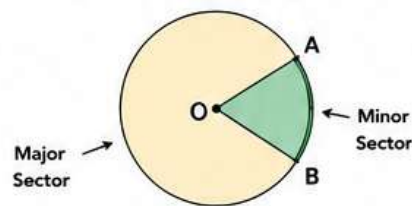
- ✗ Using πr^2 instead of the sector formula.
- ✗ Forgetting the factor $\theta/360$.
- ✗ Confusing arc length with sector area.
- ✗ Finding minor sector when the question asks for major sector.
- ✗ Writing incorrect units (cm instead of cm^2).

6 VISUAL MEMORY AID



Sector =
Two Radii
+ One Arc

Diagram 2 – Major & Minor Sectors



Major Sector =
Whole Circle –
Minor Sector



QUICK FORMULAS

Quantity	Formula
Area of Circle	πr^2
Circumference	$2\pi r$
Area of Sector	$(\theta/360) \times \pi r^2$
Arc Length	$(\theta/360) \times 2\pi r$
Major Sector	$\pi r^2 - \text{Minor Sector}$
Major Arc	$2\pi r - \text{Minor Arc}$

30 SECOND RAPID REVISION



- ✓ Sector = Two Radii + Arc
- ✓ θ determines both sector area and arc length
- ✓ Area of Sector = $(\theta/360) \times \pi r^2$
- ✓ Arc Length = $(\theta/360) \times 2\pi r$
- ✓ Major Sector = Whole Circle – Minor Sector
- ✓ Always check whether the answer requires square units or linear units

KEY TAKEAWAY



Think "Whole Circle $\times \theta/360$."
Both the area of a sector and the length of its arc are obtained by taking the corresponding whole-circle formula (πr^2 or $2\pi r$) and multiplying it by $\theta/360$. First identify whether the required region is major or minor, then apply the correct formula with appropriate units.