

Formulas to Remember

(All formulas assume the circle has radius r and angle θ in degrees unless otherwise stated.)

Circle

- Circumference:

$$C = 2\pi r$$

- Area:

$$A = \pi r^2$$

Sector (portion of a circle defined by an angle)

Let θ be the angle of the sector in **degrees**, and r the radius.

- Arc Length (fraction of circumference):

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

- Area of Sector (fraction of area):

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

If angle is given in radians:

- Arc Length:

$$\text{Arc length} = r\theta$$

- Sector Area:

$$\text{Area of sector} = \frac{1}{2}r^2\theta$$

Tips

- Minor sector: angle $< 180^\circ$
- Major sector: angle $> 180^\circ$

If you are given the **minor sector**, the major sector is simply:

$$\text{Major angle} = 360^\circ - \theta$$



Examples

Example 1: Circumference and Area

A circle has radius 7 cm. Find the:

- (a) Circumference

$$C = 2\pi r = 2\pi \times 7 = 14\pi \text{ cm } (\approx 43.98 \text{ cm})$$

- (b) Area

$$A = \pi r^2 = \pi \times 7^2 = 49\pi \text{ cm}^2 (\approx 153.94 \text{ cm}^2)$$

Example 2: Arc Length and Sector Area

A sector has radius 10 cm and angle $\theta = 90^\circ$.

- (a) Arc Length

$$\frac{90}{360} \times 2\pi \times 10 = \frac{1}{4} \times 20\pi = 5\pi \text{ cm } (\approx 15.71 \text{ cm})$$

- (b) Sector Area

$$\frac{90}{360} \times \pi \times 10^2 = \frac{1}{4} \times 100\pi = 25\pi \text{ cm}^2 (\approx 78.54 \text{ cm}^2)$$