

Areas Related to Circles

CBSE Class 10 Maths · Knowledge organiser

KEY DEFINITIONS

Sector

The region between two radii and an arc.

Segment

The region between a chord and its arc.

Minor and major

The minor sector or segment is the smaller one; the major is the larger one.

YOU SHOULD BE ABLE TO...

- Find the length of an arc and the area of a sector for any angle.
- Find segment areas for 60° , 90° and 120° , and solve clock-hand and sector-perimeter questions.
- Write complete long answers on shaded regions, combining sectors, triangles and squares without missing a piece.
- Work backwards from a given area or perimeter to the radius or angle, and handle major segments.

COMMON MISTAKES

- ✗ Adding the triangle to the sector instead of subtracting it to get the minor segment.
- ✗ Using the diameter in place of the radius.
- ✗ Forgetting the two radii when finding the perimeter of a sector.
- ✗ Using $\pi = 3.14$ when the question says $\frac{22}{7}$, or rounding too early.

KEY FORMULAS

Circle $C = 2\pi r$, $A = \pi r^2$

Arc length;
sector area
(angle θ) $l = \frac{\theta}{360^\circ} \times 2\pi r$, $A = \frac{\theta}{360^\circ} \times \pi r^2$

Segment area = sector $- \frac{1}{2}r^2 \sin \theta$

Segment, $\theta = 60^\circ, 90^\circ, 120^\circ$: subtract $\frac{\sqrt{3}}{4}r^2$, $\frac{1}{2}r^2$, $\frac{\sqrt{3}}{4}r^2$

Perimeter of
sector; ring $2r + l$; $\pi(R^2 - r^2)$

Minute hand sweeps 6° per minute; hour hand 0.5° per minute

WORKED EXAMPLE

Find the area of a sector of angle 40° in a circle of radius 21 cm ($\pi = \frac{22}{7}$).

$$\frac{40}{360} \times \frac{22}{7} \times 441 = \frac{1}{9} \times 1386 = 154 \text{ cm}^2.$$