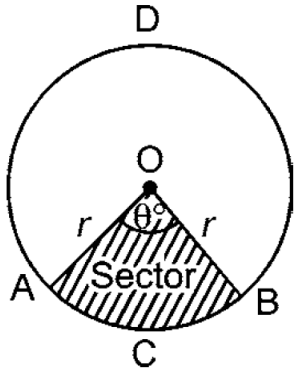
Basic Concepts

1. Perimeter (circumference) of a circle with diameter d ($d = 2r$, where r is the radius) is given by $C = \pi d = 2\pi r$
2. Perimeter of semicircle with radius $r = 2r + \pi r = r(\pi + 2)$
3. Area of a circle with radius r is given by $A = \pi r^2$
4. Area of a semicircle of radius $r = \frac{\pi r^2}{2}$
5. Area of ring whose outer and inner radii are R and r respectively = $\pi(R^2 - r^2) = \pi(R + r)(R - r)$
6. If two circles touch internally, then the distance between their centres is equal to the difference of their radii.
7. If two circles touch externally, then the distance between their centres is equal to the sum of their radii.
8. The distance moved by a rotating wheel in one revolution is equal to the circumference of the wheel.
9. The number of revolutions completed by a rotating wheel in one minute = $\frac{Distance\ moved\ in\ one\ minute}{Circumfernce\ of\ the\ wheel}$
10. Length of an arc which subtends and angle of θ at the centre = $\frac{2\pi r\theta}{360^0} = \frac{\pi r\theta}{180^0}$
11. Sector of a circle is a region enclosed by an arc of a circle and its two bounding radii.



(i) Area of sector OACBO = $\frac{\pi r^2 \theta}{360^0}$

(ii) Perimeter of sector OACBO = $2r + \frac{2\pi r\theta}{360^0}$

12. **Minor sector:** A sector of a circle is called a **minor sector** if the **minor arc** of the circle is a part of its boundary. In the above figure **minor sector** is OACB.
13. **Major sector:** A sector of a circle is called a **major sector**, if the **major arc** of the circle is a part of its boundary. In the above figure, OADB is the **major sector**.
14. The sum of the arcs of major and minor sectors of a circle is equal to the circumference of the circle.
15. The sum of the areas of major and minor sectors of a circle is equal to the area of the circle.
16. The area of a sector is given by $A = \frac{1}{2}lr$, where $l = \left(\frac{\theta r}{180^0} \times \pi\right)$
17. Angle described by minute hand in 60 minutes = 360^0

    ∴ Angle described by minute hand in one minute = $\left(\frac{360}{60}\right)^0 = 6^0$

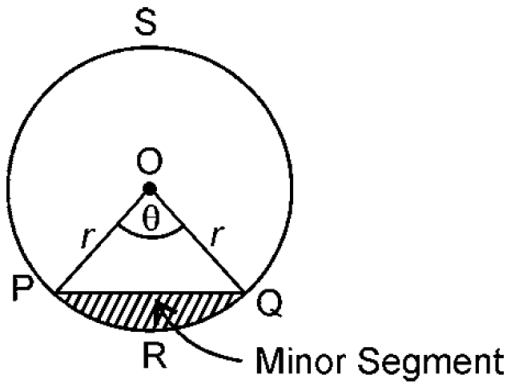
    Thus, the minute hand rotates through an angle of 6^0 in one minute.
18. Angle described by hour hand in 12 hours = 360^0

    ∴ Angle described by hour hand in 1 hours = $\left(\frac{360}{12}\right)^0 = 30^0$

    Angle described by hour hand in one minute = $\left(\frac{30}{60}\right)^0 = \frac{1}{2}$

    Thus, hour hand rotates through $\left(\frac{1}{2}\right)^0$ in 1 minute.
19. A segment of a circle is the region bounded by an arc and a chord, including the arc and the chord.

20. **Minor segment:** If the boundary of a segment is a minor arc of a circle, then the corresponding segment is called a minor segment. In the figure, segment *PQR* (the area which is shaded) is a minor segment.



21. **Major segment:** A segment corresponding to a major arc of a circle is known as the major segment. In the figure above, segment *PQSP* is a major segment.
22. Area of minor segment PRQS = $\frac{\pi r^2 \theta}{360^0} - \frac{1}{2} r^2 \sin\theta$
23. Area of major segment PSQ = πr^2 – area of minor segment PRQ.