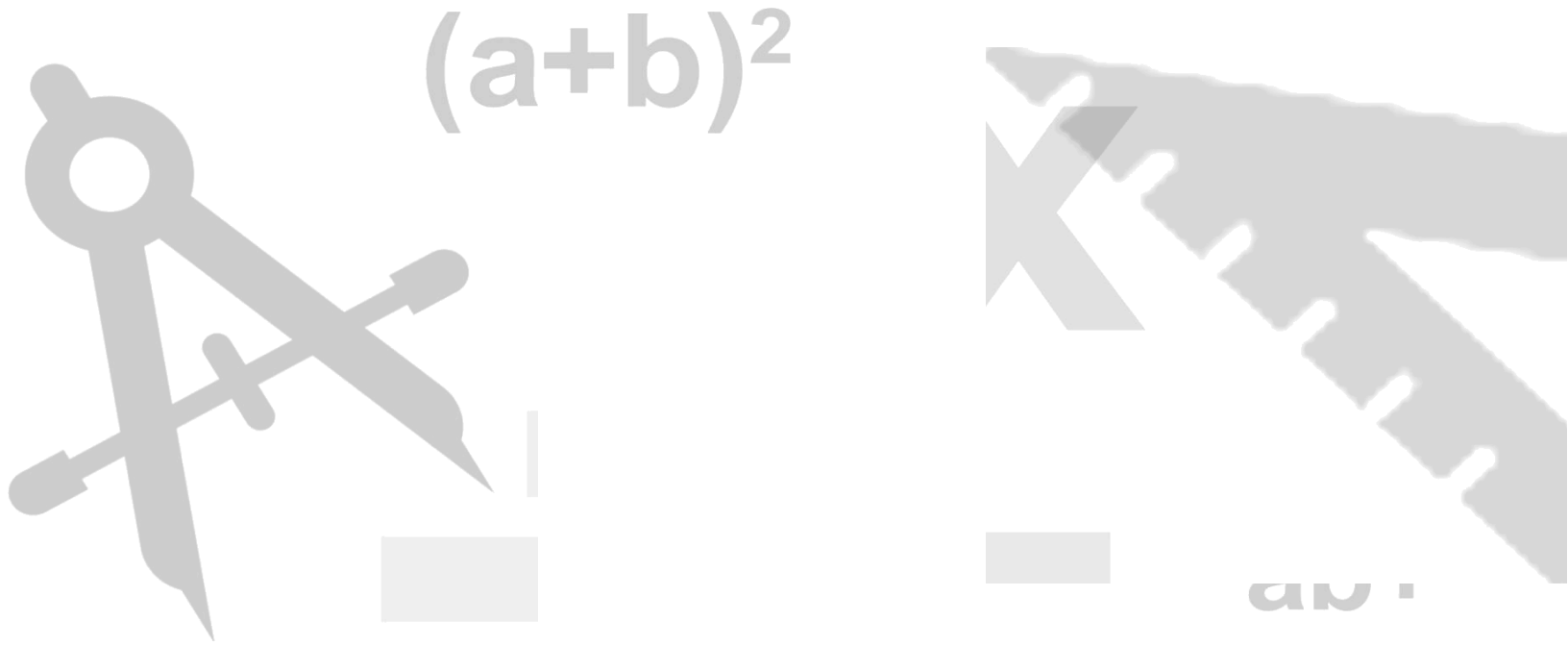
MATHS



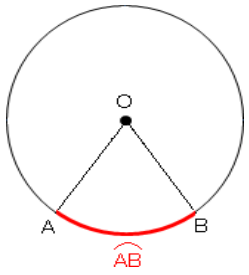
Areas Related to Circles

1. A **circle** is a set of points in a plane that are at an equal distance from a fixed point. The fixed point is called the centre of circle and equal distance is called the radius of the circle.
2. A line segment joining the centre of the circle to a point on the circle is called its **radius**.
3. A line segment joining any two points of a circle is called a **chord**. A chord passing through the centre
4. of circle is called its **diameter**.
5. The distance around the boundary of the circle is called **the perimeter or the circumference** of the circle.
6. Circumference (perimeter) of a circle = πd or $2\pi r$, where d is he diameter, r is the radius of the circle and $\pi = \frac{22}{7}$.
7. Perimeter of a semi circle or protractor = $\pi r + 2r$
8. Perimeter of a quadrant = $\frac{1}{4}$Circumference $+ 2r = \frac{\pi r}{2} + 2r$
9. Distance moved by a wheel in 1 revolution = Circumference of the wheel.

   Number of revolutions in one minute = $\frac{\text{Distance moved in 1 minute}}{\text{Circumference}}$
10. The region enclosed inside a circle is called its **area**.
11. Area of a circle = πr^2
12. Area of a semi circle = $\frac{1}{2}\pi r^2$
13. Area of a quadrant = $\frac{1}{4}$Area of circle $= \frac{1}{4}\pi r^2$
14. Circles having the same centre but different radii are called **concentric circles**.

    Area enclosed by two concentric circles = $\pi R^2 - \pi r^2 = \pi\left(R^2 - r^2\right) = \pi(R + r)(R - r)$

    Where, R and r are radii of two concentric circles
15. The part of the circumference between the two end points of the chord is called an **arc**. In the figure, arc $\overset{\frown}{AB}$ is shown.



16. A diameter of circle divides a circle into two equal arcs, each known as a **semi-circle**.

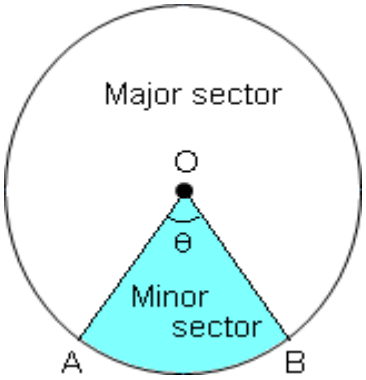
17. An arc of a circle whose length is less than that of a semicircle of the same circle is called a **minor arc**.

18. An arc of a circle whose length is greater than that of a semicircle of the same circle is called a **major arc**.

19. Length of an arc = $\frac{\pi r\theta}{180^\circ}$

20. The region bounded by an arc of a circle and two radii at its end points is called a **sector**.

If the central angle of a sector is more than 180°, then the sector is called a **major sector** and if the central angle is less than 180°, then the sector is called a **minor sector**.



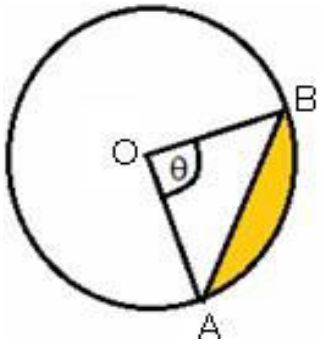
21. Perimeter of sector of angle θ = $\frac{\pi r\theta}{180^\circ} + 2r$

22. Area of a sector of angle θ = $\frac{\pi r^2\theta}{360^\circ}$

23. Area of major sector = πr^2 – Area of minor sector

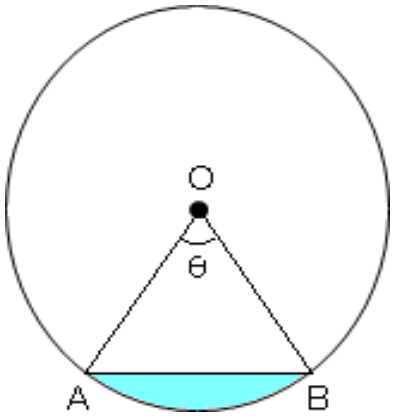
24. A chord divides the interior of a circle into two parts, each called a segment.

    The segment which is smaller than the portion of semi-circle is called the **minor segment** and the segment which is larger than the portion of semi-circle is called the **major segment**. In the circle shown, the yellow portion is the minor segment while the non-shaded portion is the major segment.



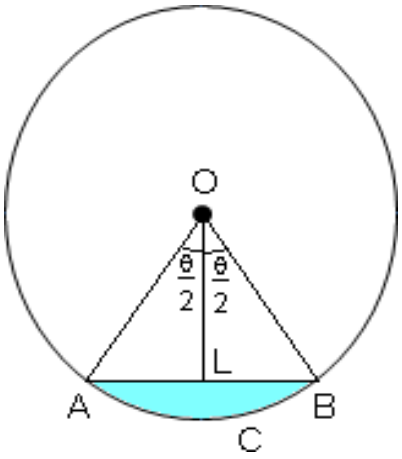
25. Perimeter of segment of angle $\theta = \frac{\pi r\theta}{180^\circ} + \overline{AB}$

26. Area of minor segment = Area of sector - Area of Δ ABC



27. Area of minor segment can also be written as:

Area of segment $ACB = \left\{\frac{\pi}{360_o}\times\theta - \sin\frac{\theta}{2}\cos\frac{\theta}{2}\right\} r^2$



28. Area of major segment = Area of the circle – Area of minor segment