1. Angle & Its Measurement

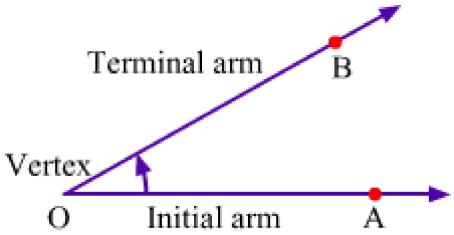
1. An angle which gives direction of rotation of a ray from a point is called **directed angle**.

2. The initial position of the ray is called **initial arm** of the angle.

3. The final position of the ray after rotation is called **terminal arm** of the angle.

4. The point about which the rotation is done is called the **vertex**.

The given figure shows $\angle AOB$, which is rotated from ray OA to ray OB in anticlockwise direction about point O.



5. If the initial arm is rotated anti-clockwise then the directed angle is positive and if it is rotated in clockwise direction then directed angle is negative.

6. If there is no rotation then the angle is called **zero angle**.

7. A directed angle whose vertex is origin and initial arm is along positive X-axis then it is called **standard angle** or **angle in standard position**.

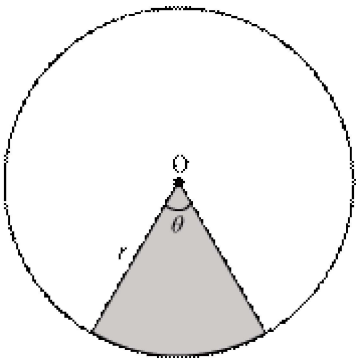
8. Measure of the standard angle is the amount of rotation of the ray from its initial position to the terminal position.

9. An angle lies in a quadrant in which its terminal arm lies.

10. If the terminal arm of a directed angle in standard position lies along the co-ordinate axes then it is called **quadrantal angle**.

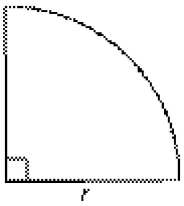
- If in a circle of radius r, an arc of length l subtends an angle of θ radians, then $l = r\theta$.
- Radian measure $= \frac{\pi}{180} \times$ Degree measure
- Degree measure $= \frac{180}{\pi} \times$ Radian measure
- A degree is divided into 60 minutes and a minute is divided into 60 seconds. One sixtieth of a degree is called a minute, written as 1', and one sixtieth of a minute is called a second, written as1".
  Thus, 1° = 60' and 1' = 60"
- **Area of sector:**

Area of the sector of angle $\theta = \frac{\theta}{360^\circ} \times \pi r^2$, where r is the radius of the circle.



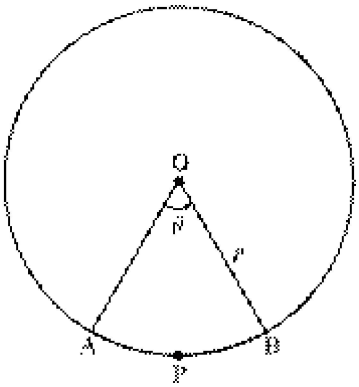
- **Area of quadrant:**

Area of a quadrant of a circle with radius r = $\frac{\pi r^2}{4}$ $\left[\theta = 90° \Rightarrow \frac{\theta}{360°} = \frac{90°}{360°} = \frac{1}{4}\right]$



- **Area of a semicircle** $= \frac{180°}{360°} \times \pi r^2 = \frac{1}{2}\pi r^2$
- **Length of an arc:**

Length of an arc of a sector of angle $\theta = \frac{\theta}{360°} \times 2\pi r$, where r is the radius of the circle



Perimeter of a Sector = $l + 2r$ l+2r