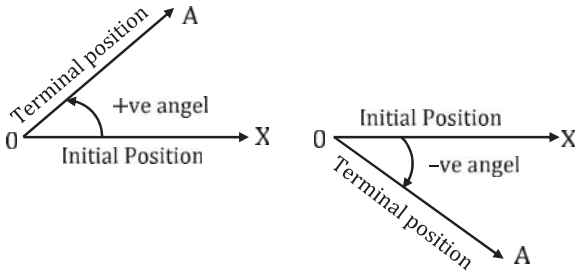
MEASUREMENT OF AN ANGLE

Angle

A shape formed by revolving a given ray around its endpoint. The angle measurement represents the degree of rotation from the starting position to the finishing position. Positive angles result from counterclockwise rotation, while negative angles arise from clockwise rotation.



Radian or Circular Measure

The angle formed at the center of a circle by an arc whose length equals the circle's radius is defined as 1 radian and is represented by 1^c. If an angle is not specified with a unit, it is assumed to be in radians. Radian measure is equivalent to real numbers. The constant ratio of a circle's circumference to its diameter is denoted by the Greek letter ' π '.

$$\pi \text{ is an irrational number, } \pi = \frac{\text{Circumference of Circle}}{\text{Diameter of circle}}$$

Circumference $= 2\,\pi\,r = \pi \times$ diameter

$$\pi = \frac{22}{7} \text{ (approx.)} = 3.1415 \ldots\ldots$$

Relation between radian, degree and grade

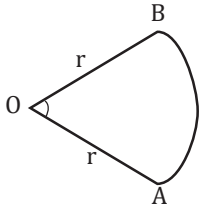
To / From	Sexagesimal System (British system)	Centesimal System (French system)	Circular System (Radian Measurement)
Sexagesimal System (British system)		1 degree $= \frac{400}{360} \cdot$ grade	1 degree (1°) $= \frac{\pi}{180}$ radian 1min(1′) = (1° = 60′) 1 sec(1″) $= \frac{1}{60}$ min(1′ = 60″)
Centesimal System (French system)	1 grade $= \frac{360}{400}$ degree		
Circular System (Radian Measurement)	1 radian $= \frac{180}{\pi}$ degree 1 degree = 60min(1° = 60′) 1min = 60sec(1′ = 60″)	1 radian $= \frac{200}{\pi}$ grade 1 grade =100 min(1^g = 100') 1 min =100 sec(1' =100'')	

The minutes and seconds in the sexagesimal system are different with the minutes and seconds respectively in the Centesimal System. Symbols in both systems are also different.

If no symbol is mentioned while showing measurement of angle, then it is considered to be measured in radians $\theta = 15$ implies 15 radian

Arc length AB $= \ell = r\theta$

Area of circular sector $= \frac{1}{2} r^2\theta$ sq. units



Conversion of some common angles

Degree	30°	45°	60°	90°	120°	135°	150°	180°	270°	360°
Radian	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{6}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π	$\frac{3\pi}{6}$	2π