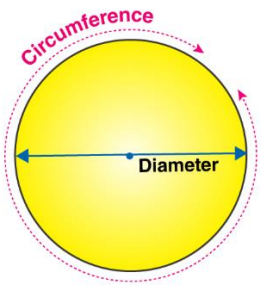
Relation Between Degree and Radian

Degree and Radian are two units to measure angles.

1 full circle = 360 degrees

1 full circle = 2π radians



Circumference of circle (C) = 2πr

Matlab agar aap poora circle ka arc length means circumference.

length l = 2πr

$$\theta = \frac{l}{r}$$

$$\theta = \frac{2\pi r}{r}$$

θ = 2π radians

Formula

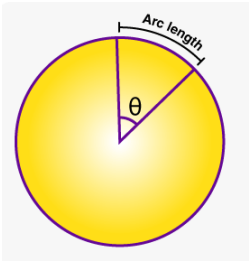
θ (in radians) = $\frac{l}{r}$

Where:

θ = angle in radians

l = arc length

r = radius



360 degrees = 2π radians

$\frac{360}{2}$ = π radians

π radians = 180°

π ≠ 180° ✗

Because π is just a number (approximately 3.14159) – not an angle.

The correct relation is:

π radians = 180 degrees

So, degree and radian are just two ways to say the same thing.

Standard Formula:

π radians = 180°

To convert:

From degree to radian

Angle in radian = $(\frac{\pi}{180})$ × angle in degree

From radian to degree

Angle in degree = $(\frac{180}{\pi})$ × angle in radian

Examples:

1. 90° = ? radians

= $(\frac{\pi}{180})$ × 90 = $\frac{\pi}{2}$ radians

2. 180° = ? radians

= $(\frac{\pi}{180})$ × 180 = π radians

3. 1 radian = ? degrees

= $(\frac{180}{\pi}) \approx 57.3°$

4. $\frac{\pi}{3}$ radians = ? degrees

=$(\frac{180}{\pi}) \times \frac{\pi}{3}$ = 60 degrees

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

⚙ Applications in Real Life

1. Circular Motion in Physics

When an object moves in a circle, angles are mostly measured in radians.

2. Trigonometry in Engineering

Most machines and robot arms calculate angles in radians for precision.

3. Mathematics Formulas

Trigonometric identities like sinθ, cosθ, etc., are easiest when angle is in radians.

	0°	30°	45°	60°	90°
SIN	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
COS	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
TAN	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	Not Defined

4. Computer Programming

Languages like Python, C++ use radian input in math functions.