

Relation between Three Systems of Measurement of an Angle.

Let D be the number of degrees, R be the number of radians and G be the number of grades in an angle θ .

Now, $90^\circ = 1$ right angle $\Rightarrow 1^\circ = \frac{1}{90}$ right angle

$\Rightarrow D^\circ = \frac{D}{90}$ right angles $\Rightarrow \theta = \frac{D}{90}$ right angles(i)

Again, π radians = 2 right angles $\Rightarrow 1$ radian = $\frac{2}{\pi}$ right angles

$\Rightarrow R$ radians = $\frac{2R}{\pi}$ right angles $\Rightarrow \theta = \frac{2R}{\pi}$ right angles(ii)

and 100 grades = 1 right angle $\Rightarrow 1$ grade = $\frac{1}{100}$ right angle

$\Rightarrow G$ grades = $\frac{G}{100}$ right angles $\Rightarrow \theta = \frac{G}{100}$ right angles(iii)

From (i), (ii) and (iii) we get,

$$\boxed{\frac{D}{90} = \frac{G}{100} = \frac{2R}{\pi}}$$

This is the required relation between the three systems of measurement of an angle.

Note: One radian = $\frac{180^\circ}{\pi} \Rightarrow \pi$ radians = $180^\circ \Rightarrow 1$ radian = $57^\circ 17' 44.8'' \approx 57^\circ 17' 45''$.