

# TURBO

*Created by students, for students*

## TRIGONOMETRIC FUNCTIONS

Class 11 Mathematics • Complete Formula Sheet

Sr.	Concept	Formulas	Other Information
<b>MEASUREMENTS &amp; IDENTITIES</b>			
1	Degree Measure	$1^\circ = 60'$ , $1' = 60''$	Sexagesimal system.
2	Radian Measure	$l = r\theta \Rightarrow \theta = \frac{l}{r}$	$\theta$ subtended at center.
3	Conversion	$\text{Radian} = \frac{\pi}{180^\circ} \times \text{Deg}$ $\text{Degree} = \frac{180^\circ}{\pi} \times \text{Rad}$	Conversion relations.
4	Basic Identities	$\sin^2 \theta + \cos^2 \theta = 1$ $1 + \tan^2 \theta = \sec^2 \theta$ $1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$	Fundamental relations.
<b>QUADRANTS &amp; PROPERTIES</b>			
5	Signs in Quadrants	I: All (+), II: sin/cosec (+), III: tan/cot (+), IV: cos/sec (+)	Angle $\theta$ ranges $0 \rightarrow 2\pi$ .
6	Domain & Range	$\sin x : \mathbb{R} \rightarrow [-1, 1]$ $\cos x : \mathbb{R} \rightarrow [-1, 1]$ $\tan x : \mathbb{R} - \{(2n+1)\frac{\pi}{2}\} \rightarrow \mathbb{R}$	Domain for all functions.
<b>TRANSFORMATION &amp; MULTIPLES</b>			
7	Transformation	$2 \sin x \cos y = \sin(x+y) + \sin(x-y)$ $\sin x + \sin y = 2 \sin \frac{x+y}{2} \cos \frac{x-y}{2}$ $\cos x - \cos y = -2 \sin \frac{x+y}{2} \sin \frac{x-y}{2}$	Product to sum and sum to product.
8	Triple Angles	$\sin 3x = 3 \sin x - 4 \sin^3 x$ $\cos 3x = 4 \cos^3 x - 3 \cos x$ $\tan 3x = \frac{3 \tan x - \tan^3 x}{1 - 3 \tan^2 x}$	Multiples of 3.
9	Half Angles	$\sin \frac{A}{2} = \pm \sqrt{\frac{1-\cos A}{2}}$ $\cos \frac{A}{2} = \pm \sqrt{\frac{1+\cos A}{2}}$	Sign depends on the quadrant of $A/2$ .

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