

Trigonometry Formulas For Class 11

Trigonometry Formulas

$$\sin(-\theta) = -\sin \theta$$

$$\cos(-\theta) = \cos \theta$$

$$\tan(-\theta) = -\tan \theta$$

$$\operatorname{cosec}(-\theta) = -\operatorname{cosec} \theta$$

$$\sec(-\theta) = \sec \theta$$

$$\cot(-\theta) = -\cot \theta$$

Product to Sum Formulas

$$\sin x \sin y = \frac{1}{2} [\cos(x - y) - \cos(x + y)]$$

$$\cos x \cos y = \frac{1}{2} [\cos(x - y) + \cos(x + y)]$$

$$\sin x \cos y = \frac{1}{2} [\sin(x + y) + \sin(x - y)]$$

$$\cos x \sin y = \frac{1}{2} [\sin(x + y) - \sin(x - y)]$$

Sum to Product Formulas

$$\sin x + \sin y = 2 \sin \left[\frac{(x + y)}{2} \right] \cos \left[\frac{(x - y)}{2} \right]$$

$$\sin x - \sin y = 2 \cos \left[\frac{(x + y)}{2} \right] \sin \left[\frac{(x - y)}{2} \right]$$

$$\cos x + \cos y = 2 \cos \left[\frac{(x + y)}{2} \right] \cos \left[\frac{(x - y)}{2} \right]$$

$$\cos x - \cos y = -2 \sin \left[\frac{(x + y)}{2} \right] \sin \left[\frac{(x - y)}{2} \right]$$

Identities

$$\sin^2 A + \cos^2 A = 1$$

$$1 + \tan^2 A = \sec^2 A$$

$$1 + \cot^2 A = \operatorname{cosec}^2 A$$

Sign of Trigonometric Functions in Different Quadrants

Quadrants→	I	II	III	IV
$\sin A$	+	+	-	-
$\cos A$	+	-	-	+
$\tan A$	+	-	+	-
$\cot A$	+	-	+	-
$\sec A$	+	-	-	+
$\operatorname{cosec} A$	+	+	-	-

Basic Trigonometric Formulas for Class 11

- $\cos (A + B) = \cos A \cos B - \sin A \sin B$
- $\cos (A - B) = \cos A \cos B + \sin A \sin B$
- $\sin (A + B) = \sin A \cos B + \cos A \sin B$
- $\sin (A - B) = \sin A \cos B - \cos A \sin B$

Based on the above addition formulas for sin and cos, we get the following below formulas:

- $\sin(\pi/2 - A) = \cos A$
- $\cos(\pi/2 - A) = \sin A$
- $\sin(\pi - A) = \sin A$
- $\cos(\pi - A) = -\cos A$
- $\sin(\pi + A) = -\sin A$

- $\cos(\pi + A) = -\cos A$
- $\sin(2\pi - A) = -\sin A$
- $\cos(2\pi - A) = \cos A$

If none of the angles A, B and $(A \pm B)$ is an odd multiple of $\pi/2$, then

- $\tan(A + B) = [(\tan A + \tan B)/(1 - \tan A \tan B)]$
- $\tan(A - B) = [(\tan A - \tan B)/(1 + \tan A \tan B)]$

If none of the angles A, B and $(A \pm B)$ is a multiple of π , then

- $\cot(A + B) = [(\cot A \cot B - 1)/(\cot B + \cot A)]$
- $\cot(A - B) = [(\cot A \cot B + 1)/(\cot B - \cot A)]$

Some additional formulas for sum and product of angles:

- $\cos(A + B) \cos(A - B) = \cos^2 A - \sin^2 B = \cos^2 B - \sin^2 A$
- $\sin(A + B) \sin(A - B) = \sin^2 A - \sin^2 B = \cos^2 B - \cos^2 A$
- $\sin A + \sin B = 2 \sin[(A + B)/2] \cos[(A - B)/2]$

Formulas for twice of the angles:

- $\sin 2A = 2 \sin A \cos A = [2 \tan A / (1 + \tan^2 A)]$
- $\cos 2A = \cos^2 A - \sin^2 A = 1 - 2\sin^2 A = 2 \cos^2 A - 1 = [(1 - \tan^2 A) / (1 + \tan^2 A)]$
- $\tan 2A = (2 \tan A) / (1 - \tan^2 A)$

Formulas for thrice of the angles:

- $\sin 3A = 3 \sin A - 4 \sin^3 A$
- $\cos 3A = 4 \cos^3 A - 3 \cos A$
- $\tan 3A = [3 \tan A - \tan^3 A] / [1 - 3 \tan^2 A]$