



# Trigonométrie

Fiche n°1

Niveau : 2<sup>ème</sup> Sciences

## Identités Fondamentales

$$\begin{aligned}\sin^2 \alpha + \cos^2 \alpha &= 1 \\ \tan \alpha &= \frac{\sin \alpha}{\cos \alpha} \quad , \quad \cot \alpha = \frac{\cos \alpha}{\sin \alpha} \quad , \quad \tan \alpha = \frac{1}{\cot \alpha} \quad , \quad \cot \alpha = \frac{1}{\tan \alpha} \\ 1 + \tan^2 \alpha &= \frac{1}{\cos^2 \alpha} \quad , \quad 1 + \cot^2 \alpha = \frac{1}{\sin^2 \alpha}\end{aligned}$$

## Formules d'Addition et Soustraction

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin \alpha \cos \beta \pm \cos \alpha \sin \beta \\ \cos(\alpha \pm \beta) &= \cos \alpha \cos \beta \mp \sin \alpha \sin \beta \\ \tan(\alpha \pm \beta) &= \frac{\tan \alpha \pm \tan \beta}{1 \mp \tan \alpha \tan \beta} \quad , \quad \cot(\alpha \pm \beta) = \frac{\cot \alpha \cot \beta \mp 1}{\cot \beta \pm \cot \alpha}\end{aligned}$$

## Formules de l'Angle Double

$$\sin 2\alpha = 2 \sin \alpha \cos \alpha \quad , \quad \cos 2\alpha = \cos^2 \alpha - \sin^2 \alpha \quad , \quad \tan 2\alpha = \frac{2 \tan \alpha}{1 - \tan^2 \alpha}$$

## Formules de l'Angle Moitié

$$\begin{aligned}\sin \alpha &= \frac{2 \tan \frac{\alpha}{2}}{1 + \tan^2 \frac{\alpha}{2}} \quad , \quad \cos \alpha = \frac{1 - \tan^2 \frac{\alpha}{2}}{1 + \tan^2 \frac{\alpha}{2}} \\ 1 + \cos \alpha &= 2 \cos^2 \frac{\alpha}{2} \quad , \quad 1 - \cos \alpha = 2 \sin^2 \frac{\alpha}{2} \\ \tan \frac{\alpha}{2} &= \frac{1 - \cos \alpha}{1 + \cos \alpha} = \frac{\sin \alpha}{1 + \cos \alpha} = \frac{1 - \cos \alpha}{\sin \alpha}\end{aligned}$$

## Transformation de Sommes en Produits

$$\begin{aligned}\sin \alpha + \sin \beta &= 2 \sin \frac{\alpha + \beta}{2} \cos \frac{\alpha - \beta}{2} \quad , \quad \sin \alpha - \sin \beta = 2 \sin \frac{\alpha - \beta}{2} \cos \frac{\alpha + \beta}{2} \\ \cos \alpha + \cos \beta &= 2 \cos \frac{\alpha + \beta}{2} \cos \frac{\alpha - \beta}{2} \quad , \quad \cos \alpha - \cos \beta = 2 \sin \frac{\alpha + \beta}{2} \sin \frac{\beta - \alpha}{2}\end{aligned}$$

## Transformation de Produits en Sommes

$$\begin{aligned}\sin \alpha \sin \beta &= \frac{1}{2}[\cos(\alpha - \beta) - \cos(\alpha + \beta)] \quad , \quad \cos \alpha \cos \beta = \frac{1}{2}[\cos(\alpha - \beta) + \cos(\alpha + \beta)] \\ \sin \alpha \cos \beta &= \frac{1}{2}[\sin(\alpha - \beta) + \sin(\alpha + \beta)] \quad , \quad \tan \alpha \pm \tan \beta = \frac{\sin(\alpha \pm \beta)}{\cos \alpha \cos \beta}\end{aligned}$$

## Formules de Récurrence

Fonction	$-\alpha$	$\frac{\pi}{2} - \alpha$	$\frac{\pi}{2} + \alpha$	$\pi - \alpha$	$\pi + \alpha$	$\frac{3\pi}{2} - \alpha$	$\frac{3\pi}{2} + \alpha$
$\sin \alpha$	$-\sin \alpha$	$\cos \alpha$	$\cos \alpha$	$\sin \alpha$	$-\sin \alpha$	$-\cos \alpha$	$-\cos \alpha$
$\cos \alpha$	$\cos \alpha$	$\sin \alpha$	$-\sin \alpha$	$-\cos \alpha$	$-\cos \alpha$	$-\sin \alpha$	$\sin \alpha$
$\tan \alpha$	$-\tan \alpha$	$\cot \alpha$	$-\cot \alpha$	$-\tan \alpha$	$\tan \alpha$	$\cot \alpha$	$-\cot \alpha$
$\cot \alpha$	$-\cot \alpha$	$\tan \alpha$	$-\tan \alpha$	$-\cot \alpha$	$\cot \alpha$	$\tan \alpha$	$-\tan \alpha$

## Valeurs Remarquables

$\alpha$	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\pi$
$\sin \alpha$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	0
$\cos \alpha$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	-1
$\tan \alpha$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	—	$-\sqrt{3}$	0
$\cot \alpha$	—	$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$	0	$-\frac{\sqrt{3}}{3}$	—