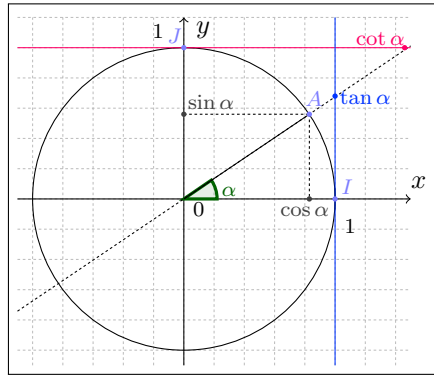


TRIGONOMÉTRIE : FORMULAIRE



1. Angles remarquables

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

2. Angles associés

<p><i>Angles supplémentaires</i></p> <p> $\sin(\pi - \alpha) = \sin \alpha$ $\cos(\pi - \alpha) = -\cos \alpha$ $\tan(\pi - \alpha) = -\tan \alpha$ $\cot(\pi - \alpha) = -\cot \alpha$ </p>	<p><i>Angles anti-supplémentaires</i></p> <p> $\sin(\pi + \alpha) = -\sin \alpha$ $\cos(\pi + \alpha) = -\cos \alpha$ $\tan(\pi + \alpha) = \tan \alpha$ $\cot(\pi + \alpha) = \cot \alpha$ </p>
<p><i>Angles opposés</i></p> <p> $\sin(-\alpha) = -\sin \alpha$ $\cos(-\alpha) = \cos \alpha$ $\tan(-\alpha) = -\tan \alpha$ $\cot(-\alpha) = -\cot \alpha$ </p>	<p><i>Angles complémentaires</i></p> <p> $\sin\left(\frac{\pi}{2} - \alpha\right) = \cos \alpha$ $\cos\left(\frac{\pi}{2} - \alpha\right) = \sin \alpha$ $\tan\left(\frac{\pi}{2} - \alpha\right) = \cot \alpha$ $\cot\left(\frac{\pi}{2} - \alpha\right) = \tan \alpha$ </p>

3. Identités fondamentales

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

4. Formules de duplication

$$\begin{aligned} \cos 2a &= \cos^2 a - \sin^2 a \\ \cos 2a &= 2 \cos^2 a - 1 \\ \cos 2a &= 1 - 2 \sin^2 a \\ \sin 2a &= 2 \sin a \cos a \\ \tan 2a &= \frac{2 \tan a}{1 - \tan^2 a} \end{aligned}$$

5. Formules de Carnot¹

$$\begin{aligned} \cos^2 a &= \frac{1 + \cos 2a}{2} \\ \sin^2 a &= \frac{1 - \cos 2a}{2} \end{aligned}$$

6. Formules d'addition

$$\begin{aligned} \cos(a + b) &= \cos a \cos b - \sin a \sin b \\ \cos(a - b) &= \cos a \cos b + \sin a \sin b \\ \sin(a + b) &= \sin a \cos b + \cos a \sin b \\ \sin(a - b) &= \sin a \cos b - \cos a \sin b \\ \tan(a + b) &= \frac{\tan a + \tan b}{1 - \tan a \tan b} \\ \tan(a - b) &= \frac{\tan a - \tan b}{1 + \tan a \tan b} \end{aligned}$$

7. Formules de Simpson

$$\begin{aligned} \sin p + \sin q &= 2 \sin \frac{p+q}{2} \cos \frac{p-q}{2} \\ \sin p - \sin q &= 2 \cos \frac{p+q}{2} \sin \frac{p-q}{2} \\ \cos p + \cos q &= 2 \cos \frac{p+q}{2} \cos \frac{p-q}{2} \\ \cos p - \cos q &= -2 \sin \frac{p+q}{2} \sin \frac{p-q}{2} \end{aligned}$$

8. Formules de Simpson inverses²

$$\begin{aligned} \sin a \sin b &= -\frac{1}{2} (\cos(a+b) - \cos(a-b)) \\ \sin a \cos b &= \frac{1}{2} (\sin(a+b) + \sin(a-b)) \\ \cos a \cos b &= \frac{1}{2} (\cos(a+b) + \cos(a-b)) \end{aligned}$$

9. Formules en $\tan \frac{x}{2}$ ³

Si on pose $t = \tan \frac{x}{2}$, on a :

$$\begin{aligned} \sin x &= \frac{2t}{1+t^2} \\ \cos x &= \frac{1-t^2}{1+t^2} \\ \tan x &= \frac{2t}{1-t^2} \end{aligned}$$

10. Equations trigonométriques

$$\sin x = \sin a \Leftrightarrow \begin{cases} x = a + 2k\pi \\ x = \pi - a + 2k\pi \end{cases} \quad k \in \mathbb{Z}$$

$$\cos x = \cos a \Leftrightarrow \begin{cases} x = a + 2k\pi \\ x = -a + 2k\pi \end{cases} \quad k \in \mathbb{Z}$$

$$\tan x = \tan a \Leftrightarrow x = a + k\pi \quad k \in \mathbb{Z}$$

