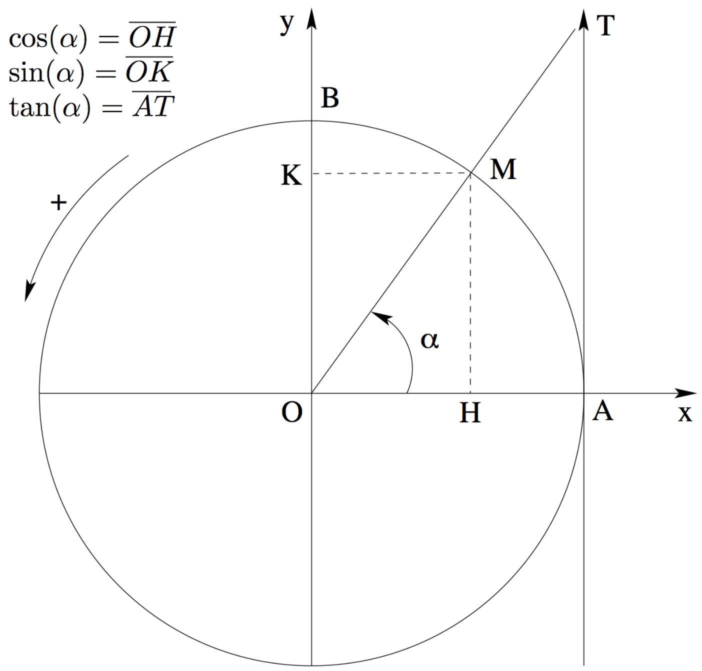
FORMULAIRE DE TRIGONOMÉTRIE CIRCULAIRE



Formule fondamentale

$$\cos^2(\alpha) + \sin^2(\alpha) = 1$$

Cas d'égalité

$$\cos(\alpha) = \cos(\beta) \Leftrightarrow \begin{vmatrix} \exists k \in \mathbb{Z} & ; & \alpha = \beta + 2k\pi \\ \text{ou} & & \\ \exists k \in \mathbb{Z} & ; & \alpha = -\beta + 2k\pi \end{vmatrix}$$

$$\sin(\alpha) = \sin(\beta) \Leftrightarrow \begin{vmatrix} \exists k \in \mathbb{Z} & ; & \alpha = \beta + 2k\pi \\ \text{ou} & & \\ \exists k \in \mathbb{Z} & ; & \alpha = \pi - \beta + 2k\pi \end{vmatrix}$$

Formules de symétrie

$$\begin{array}{rclcrcl}
\cos(-\alpha) & = & \cos(\alpha) & ; & \sin(-\alpha) & = & -\sin(\alpha) \\
\cos(\pi-\alpha) & = & -\cos(\alpha) & ; & \sin(\pi-\alpha) & = & \sin(\alpha) \\
\cos(\pi+\alpha) & = & -\cos(\alpha) & ; & \sin(\pi+\alpha) & = & -\sin(\alpha) \\
\cos\left(\frac{\pi}{2}-\alpha\right) & = & \sin(\alpha) & ; & \sin\left(\frac{\pi}{2}-\alpha\right) & = & \cos(\alpha) \\
\cos\left(\frac{\pi}{2}+\alpha\right) & = & -\sin(\alpha) & ; & \sin\left(\frac{\pi}{2}+\alpha\right) & = & \cos(\alpha)
\end{array}$$

Valeurs remarquables

α	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\sin(\alpha)$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos(\alpha)$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
$\tan(\alpha)$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	ND

Formules d'addition

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

Formules de duplication

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

$$\sin(2a) = 2\sin(a)\cos(a)$$

Transformation de produits en sommes

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

Transformations de sommes en produits

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