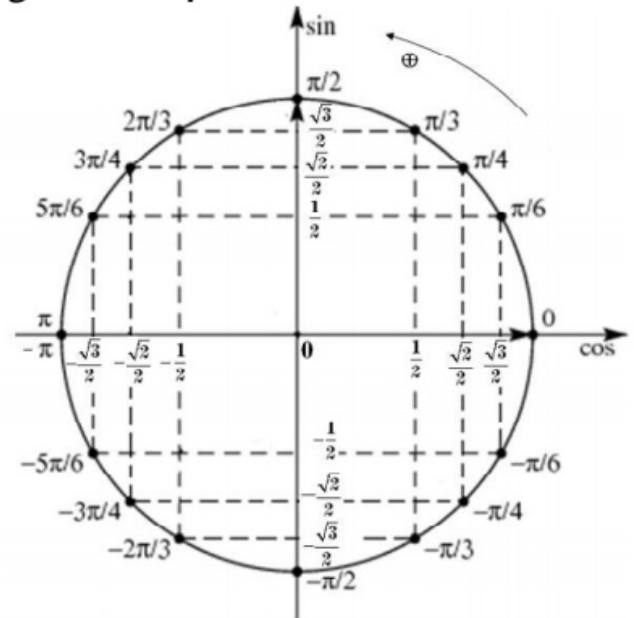


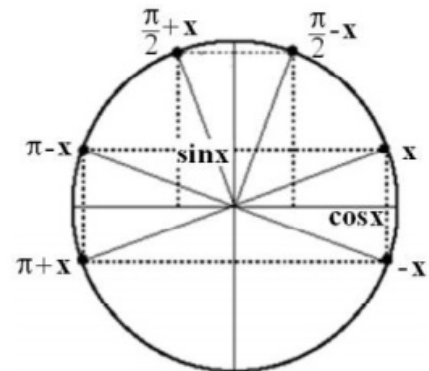
➤ Tableau des valeurs remarquables et cercle trigonométrique:

x	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\sin x$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos x$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
$\tan x$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	



➤ Les formules des angles associés :

	$-x$	$\pi - x$	$\pi + x$	$\frac{\pi}{2} - x$	$\frac{\pi}{2} + x$
$\sin$	$-\sin x$	$\sin x$	$-\sin x$	$\cos x$	$\cos x$
$\cos$	$\cos x$	$-\cos x$	$-\cos x$	$\sin x$	$-\sin x$



$-1 \leq \cos x \leq 1$ $-1 \leq \sin x \leq 1$ $\cos^2 x + \sin^2 x = 1$	$\tan x = \frac{\sin x}{\cos x}$ $1 + \tan^2 x = \frac{1}{\cos^2 x}$	$\cos(x + 2k\pi) = \cos x$ $\sin(x + 2k\pi) = \sin x$ $\tan(x + k\pi) = \tan x$
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➤ Equations trigonométriques :

- $\cos x = \cos a \Leftrightarrow x = a + 2k\pi$ ou $x = -a + 2k\pi$
- $\sin x = \sin a \Leftrightarrow x = a + 2k\pi$ ou $x = (\pi - a) + 2k\pi$
- $\tan x = \tan a \Leftrightarrow x = a + k\pi \quad (k \in \mathbb{Z})$

➤ **Formules d'addition :**

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

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

➤ **Formules de duplication :**

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

$$\sin 2a = 2 \sin a \times \cos a$$

$$\tan 2a = \frac{2 \tan a}{1 - \tan^2 a}$$

$$\cos^2 a = \frac{1 + \cos 2a}{2}$$

$$\sin^2 a = \frac{1 - \cos 2a}{2}$$

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

$$\sin a = \frac{2t}{1+t^2}$$

$$\cos a = \frac{1-t^2}{1+t^2}$$

$$\tan a = \frac{2t}{1-t^2}$$

➤ **Transformation des produits- transformation des sommes :**

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

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

➤ **Transformation de $a \cos x + b \sin x$:**

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

avec α un réel tel que : $\cos \alpha = \frac{a}{\sqrt{a^2 + b^2}}$ et $\sin \alpha = \frac{b}{\sqrt{a^2 + b^2}}$