Lycée Ibn Khaldoun BOUZNIKA	Calcul trigonométrique	AGOUZAL
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Equations trigonométriques

$\cos x = 1 \Leftrightarrow x = 2k\pi$

$\cos x = -1 \Leftrightarrow x = \pi + 2k\pi$

$\cos x = \cos\alpha \Leftrightarrow \begin{cases} x = \alpha + 2k\pi \\ x = -\alpha + 2k\pi \end{cases}$

$\cos x = 0 \Leftrightarrow x = \dfrac{\pi}{2} + k\pi$

$\sin x = 1 \Leftrightarrow x = \dfrac{\pi}{2} + 2k\pi$

$\sin x = -1 \Leftrightarrow x = -\dfrac{\pi}{2} + 2k\pi$

$\sin x = 0 \Leftrightarrow x = k\pi$

$\sin x = \sin\alpha \Leftrightarrow \begin{cases} x = \alpha + 2k\pi \\ x = \pi - \alpha + 2k\pi \end{cases}$

$\tan x = \tan\alpha \Leftrightarrow x = \alpha + k\pi$

Formules de transformations

$\tan(a+b) = \dfrac{\tan a + \tan b}{1 - \tan a \cdot \tan b}$

$\tan(a-b) = \dfrac{\tan a - \tan b}{1 + \tan a \cdot \tan b}$

$\cos(a+b) = \cos a \cos b - \sin a \sin b$

$\cos(a-b) = \cos a \cos b + \sin a \sin b$

$\sin(a+b) = \sin a \cos b + \cos a \sin b$

$\sin(a-b) = \sin a \cos b - \cos a \sin b$

$\cos^2 a = \dfrac{1+\cos(2a)}{2}$

$\sin^2 a = \dfrac{1-\cos(2a)}{2}$

$\sin a \cos a = \dfrac{1}{2}\sin(2a)$

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

$= 2\cos^2 a - 1$

$= 1 - 2\sin^2 a$

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

$\tan(2a) = \dfrac{2\tan a}{1 - \tan^2 a}$

$\cos a \cos b = \dfrac{1}{2}\left[\cos(a+b) + \cos(a-b)\right]$

$\sin a \sin b = -\dfrac{1}{2}\left[\cos(a+b) - \cos(a-b)\right]$

$\sin a \cos b = \dfrac{1}{2}\left[\sin(a+b) + \sin(a-b)\right]$

$\cos p + \cos q = 2\cos\dfrac{p+q}{2} \cdot \cos\dfrac{p-q}{2}$

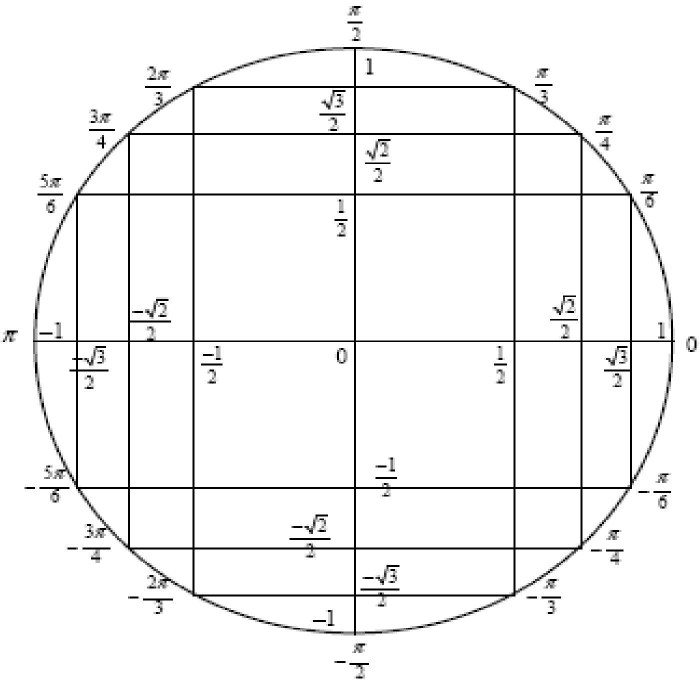
$\cos p - \cos q = -2\sin\dfrac{p+q}{2} \cdot \sin\dfrac{p-q}{2}$

$\sin p + \sin q = 2\sin\dfrac{p+q}{2} \cdot \cos\dfrac{p-q}{2}$

$\sin p - \sin q = 2\cos\dfrac{p+q}{2} \cdot \sin\dfrac{p-q}{2}$

On pose $t = \tan\dfrac{x}{2}$

$\cos x = \dfrac{1-t^2}{1+t^2}$ $\quad \sin x = \dfrac{2t}{1+t^2}$ $\quad \tan x = \dfrac{2t}{1-t^2}$



x	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π
$\cos x$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	$\frac{-1}{2}$	$\frac{-\sqrt{2}}{2}$	$\frac{-\sqrt{3}}{2}$	-1
$\sin x$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
$\tan x$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	✕	$-\sqrt{3}$	-1	$-\frac{1}{\sqrt{3}}$	0

$(\forall x \in \mathbb{R}) : -1 \leq \cos x \leq 1 \quad ; \quad -1 \leq \sin x \leq 1$

$1 + \tan^2 x = \dfrac{1}{\cos^2 x}$ $\quad \cos^2 x + \sin^2 x = 1$ $\quad \tan x = \dfrac{\sin x}{\cos x}$

$\tan(x + k\pi) = \tan x$ $\quad \sin(x + 2k\pi) = \sin x$ $\quad \cos(x + 2k\pi) = \cos x$

$\tan(-x) = -\tan x$ $\quad \sin(-x) = -\sin x$ $\quad \cos(-x) = \cos x$

$\cos(\pi + x) = -\cos x$

$\sin(\pi + x) = -\sin x$

$\tan(\pi + x) = \tan x$

$\cos(\pi - x) = -\cos x$

$\sin(\pi - x) = \sin x$

$\tan(\pi - x) = -\tan x$

$\cos\left(\dfrac{\pi}{2} + x\right) = -\sin x$

$\sin\left(\dfrac{\pi}{2} + x\right) = \cos x$

$\tan\left(\dfrac{\pi}{2} + x\right) = -\dfrac{1}{\tan x}$

$\cos\left(\dfrac{\pi}{2} - x\right) = \sin x$

$\sin\left(\dfrac{\pi}{2} - x\right) = \cos x$

$\tan\left(\dfrac{\pi}{2} - x\right) = \dfrac{1}{\tan x}$