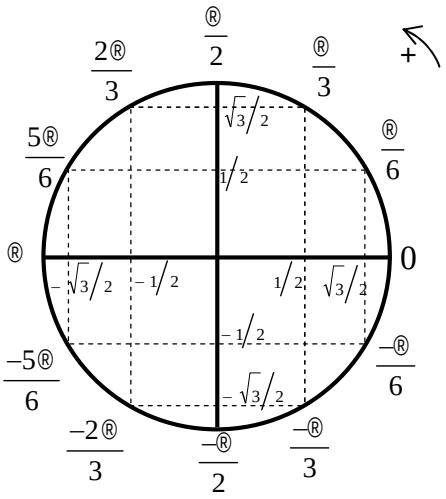
مذكرة القواعد	الحساب المثلثي	1 ع ر-ت

النسب المثلثية للزوايا الهامة



~	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
$\sin\sim$	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
$\cos\sim$	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
$\tan\sim$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$		$-\sqrt{3}$	-1	$-\frac{\sqrt{3}}{3}$	0

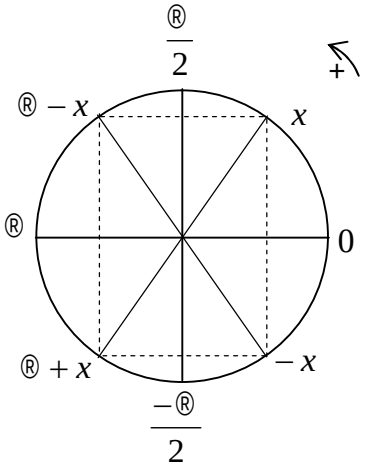
صيغ و تعاريف مثلثية هامة

$\sin^2 x+\cos^2 x=1$	$\tan x=\frac{\sin x}{\cos x}$	$\cot x=\frac{1}{\tan x}=\frac{\cos x}{\sin x}$	$\tan^2 x=\frac{1}{\cos^2 x}-1$	$\cot^2 x=\frac{1}{\sin^2 x}-1$

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

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

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



المعادلات المثلثية

$\cos x=\cos y \Leftrightarrow (x=y+2k\pi/k\in Z)$ ou $(x=-y+2k\pi/k\in Z)$
$\sin x=\sin y \Leftrightarrow (x=y+2k\pi/k\in Z)$ ou $(x=(\pi-y)+2k\pi/k\in Z)$
$\tan x=\tan y \Leftrightarrow x=y+k\pi/k\in Z$

حـــــالات خاصة

$\sin x = 0 \Leftrightarrow x = k\pi \ / k \in Z$	$\cos x = 0 \Leftrightarrow x = \frac{\pi}{2} + k\pi \ / k \in Z$	$\tan x = 0 \Leftrightarrow x = k\pi \ / k \in Z$
$\sin x = 1 \Leftrightarrow x = \frac{\pi}{2} + 2k\pi \ / k \in Z$	$\cos x = 1 \Leftrightarrow x = 2k\pi \ / k \in Z$	$\tan x = 1 \Leftrightarrow x = \frac{\pi}{4} + k\pi \ / k \in Z$
$\sin x = -1 \Leftrightarrow x = \frac{-\pi}{2} + 2k\pi \ / k \in Z$	$\cos x = -1 \Leftrightarrow x = (2k+1)\pi \ / k \in Z$	$\tan x = -1 \Leftrightarrow x = \frac{-\pi}{4} + k\pi \ / k \in Z$

صيغ التحويل

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

صيغ النشر و التعميل

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

المربع و الضعف

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

كتابة $\sin a$ و $\cos a$ و $\tan a$ بدلالة $\tan\frac{a}{2}$

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