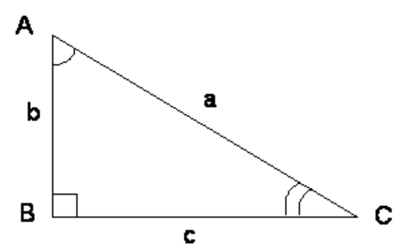
Funcții trigonometrice

Definiția funcțiilor trigonometrice se bazează pe rapoarte între laturi ale unui triunghi dreptunghic plan. Într-un astfel de triunghi, latura cea mai lungă, opusă unghiului drept, se numește ***ipotenuză***, iar laturile care formează unghiul drept se numesc ***catete***.

Notam unghiul $\sphericalangle(BAC)$ cu α si unghiul $\sphericalangle(ACB)$ cu β, si AB=b; AC= a; BC=c



Exemplu pentru cazul de sus:

sinus $=\dfrac{cateta.opusa}{ipotenuza}$	$\sin\alpha=\dfrac{c}{a}$	$\sin\beta=\dfrac{b}{a}$
cosinus $=\dfrac{cateta.alaturata}{ipotenuza}$	$\cos\alpha=\dfrac{b}{a}$	$\cos\beta=\dfrac{c}{a}$
tangenta $=\dfrac{cateta.opusa}{cateta.alaturata}$	$tg\alpha=\dfrac{c}{b}$	$tg\beta=\dfrac{b}{c}$
cotangenta $=\dfrac{cateta.alaturata}{cateta.opusa}$	$ctg\alpha=\dfrac{b}{c}$	$ctg\beta=\dfrac{c}{b}$

Relații uzuale :

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

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

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

$$tg\alpha=\frac{\sin\alpha}{\cos\alpha}$$

$$ctg\alpha=\frac{\cos\alpha}{\sin\alpha}$$

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

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

$$\sin a\sin b=\frac{\cos(a-b)-\cos(a+b)}{2}$$

$$\cos a\cos b=\frac{\cos(a-b)+\cos(a+b)}{2}$$

$$\sin a\cos b=\frac{\sin(a-b)+\sin(a+b)}{2}$$

$$\sin(90^0-\alpha)=\cos\alpha$$

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

$$\cos(90^0-\alpha)=\sin\alpha$$

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

$$\cos\alpha=\sin\left(\frac{\pi}{2}-\alpha\right)$$

$$tg(90^0-\alpha)=ctg\alpha$$

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

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

$$\sin\alpha=\cos\left(\frac{\pi}{2}-\alpha\right)$$

$$tg\alpha=ctg\left(\frac{\pi}{2}-\alpha\right)$$

$$ctg(-x)=-ctgx$$

$$\cos(x-y)=\cos x\cos y+\sin x\sin y, oricare, x, y\in R$$

$$\cos(x+2\pi)=\cos x$$

$$\cos(x+y)=\cos x\cos y-\sin x\sin y$$

$$\sin 2x=2\sin x\cos x$$

$$\sin(x+y)=\sin x\cos y+\cos x\sin y$$

$$\sin(x-y)=\sin x\cos y-\cos x\sin y$$

$$tg(\pi-x)=-tgx$$

$$tg(-x)=-tgx$$

$$ctg(x+\pi)=ctgx$$

$$\sin\alpha+\sin\beta=2\sin\frac{\alpha+\beta}{2}\cos\frac{\alpha-\beta}{2}, oricare, \alpha, \beta\in R$$

$$\sin\alpha-\sin\beta=2\sin\frac{\alpha-\beta}{2}\cos\frac{\alpha+\beta}{2}, oricare, \alpha, \beta\in R$$

$$\cos\alpha+\cos\beta=2\cos\frac{\alpha+\beta}{2}\cos\frac{\alpha-\beta}{2}, oricare, \alpha, \beta\in R$$

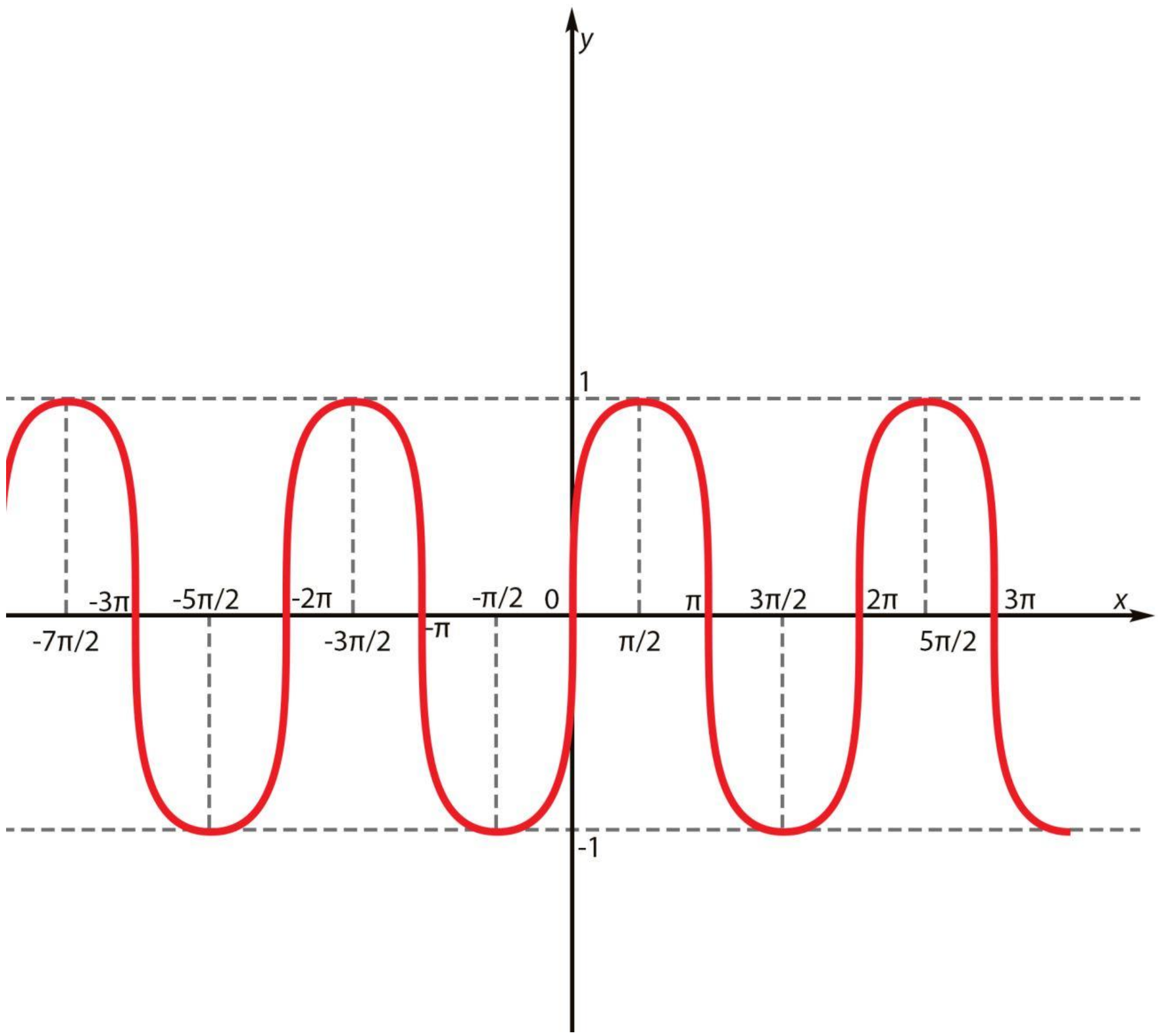
$$\cos\alpha-\cos\beta=-2\sin\frac{\alpha+\beta}{2}\sin\frac{\alpha-\beta}{2}, oricare, \alpha, \beta\in R$$

Valori uzuale:

	0^0	30^0	45^0	60^0	90^0
sinx	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
cosx	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
tgx	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	-
ctgx	-	$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$	0

Graficul funcției : $\sin(x)$

x	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
$y = \sin x$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	0	-1	0



Graficul funcției : cos(x)

x	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
$y = \cos x$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	-1	0	1