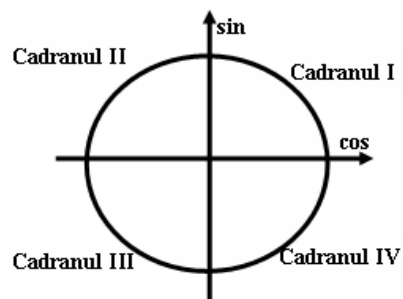


FORMULE TRIGONOMETRICE UZUALE

Tabелul trigonometric

	0	30	45	60	90
sin	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
tg	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	\
ctg	\	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0
linie de construcție	$\frac{\sqrt{0}}{2}$	$\frac{\sqrt{1}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{4}}{2}$

Cercul trigonometric



Semnele în cele 4 cadrane

$$x \in Cd.I \Rightarrow \begin{cases} \cos x > 0 \\ \sin x > 0 \end{cases}$$

$$x \in Cd.II \Rightarrow \begin{cases} \cos x < 0 \\ \sin x > 0 \end{cases}$$

$$x \in Cd.III \Rightarrow \begin{cases} \cos x < 0 \\ \sin x < 0 \end{cases}$$

$$x \in Cd.IV \Rightarrow \begin{cases} \cos x > 0 \\ \sin x < 0 \end{cases}$$

Paritate, imparitate:

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

$$\operatorname{tg}(-x) = -\operatorname{tg}x \quad \operatorname{ctg}(-x) = -\operatorname{ctg}x$$

Periodicitate

$$\sin(x + 2k\pi) = \sin x, \forall k \in \mathbb{Z},$$

$$\cos(x + 2k\pi) = \cos x, \forall k \in \mathbb{Z}$$

$$\operatorname{tg}(x + k\pi) = \operatorname{tg}x, \forall k \in \mathbb{Z},$$

$$\operatorname{ctg}(x + k\pi) = \operatorname{ctg}x, \forall k \in \mathbb{Z}$$

Formula trig fundamentală

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

Formule trigon

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

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

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

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

$$\operatorname{tg}(a+b) = \frac{\operatorname{tga} + \operatorname{tgb}}{1 - \operatorname{tga} \cdot \operatorname{tgb}}$$

$$\operatorname{tg}(a-b) = \frac{\operatorname{tga} - \operatorname{tgb}}{1 + \operatorname{tga} \cdot \operatorname{tgb}}$$

$$\operatorname{ctg}(a+b) = \frac{\operatorname{ctga} \cdot \operatorname{ctgb} - 1}{\operatorname{ctgb} + \operatorname{ctga}}$$

$$\operatorname{ctg}(a-b) = \frac{\operatorname{ctga} \cdot \operatorname{ctgb} + 1}{\operatorname{ctgb} - \operatorname{ctga}}$$

Formule pentru dublul unui unghi

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

$$\cos 2x = \cos^2 x - \sin^2 x$$

$$\cos 2x = 2 \cos^2 x - 1$$

$$\cos 2x = 1 - 2 \sin^2 x$$

$$\operatorname{tg} 2x = \frac{2 \cdot \operatorname{tg}x}{1 - \operatorname{tg}^2 x}$$

$$\operatorname{ctg} 2x = \frac{(\operatorname{ctg}x)^2 - 1}{2 \operatorname{ctg}x}$$

$$\cos 3x = 4 \cos^3 x - 3 \cos x$$

$$\sin 3x = 3 \sin x - 4 \sin^3 x$$

Formule pentru jumătatea unui unghi

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

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

Substituția universală

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

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

$$\operatorname{tga} = \frac{2 \operatorname{tg} \frac{a}{2}}{1 - \operatorname{tg}^2 \frac{a}{2}}$$

Transformarea produselor în sume

$$\sin a \cdot \cos b = \frac{1}{2} (\sin(a+b) + \sin(a-b))$$

$$\cos a \cdot \sin b = \frac{1}{2} (\sin(a+b) - \sin(a-b))$$

$$\cos a \cdot \cos b = \frac{1}{2} (\cos(a+b) + \cos(a-b))$$

$$\sin a \cdot \sin b = -\frac{1}{2} (\cos(a+b) - \cos(a-b))$$

Transformarea sumelor în produs

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

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

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

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

$$\operatorname{tga} + \operatorname{tgb} = \frac{\sin(a+b)}{\cos a \cos b}$$

$$\operatorname{tga} - \operatorname{tgb} = \frac{\sin(a-b)}{\cos a \cos b}$$

$$\operatorname{ctga} + \operatorname{ctgb} = \frac{\sin(a+b)}{\sin a \sin b}$$

$$\operatorname{ctga} - \operatorname{ctgb} = \frac{\sin(a-b)}{\sin a \sin b}$$