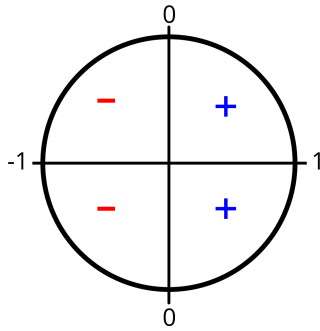
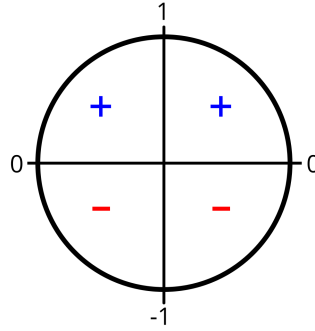


## Círculos Trigonômétricos

Função  $\cos x$ 

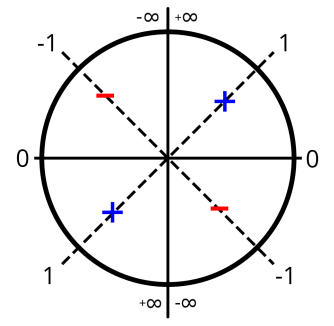
Função Par

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

Função  $\sin x$ 

Função Ímpar

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

Função  $\tan x$ 

Função Ímpar

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

## Fórmula Fundamental da Trigonometria

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

O quadro seguinte apresenta as Fórmulas Trigonométricas mais usadas.

$\tan x = \frac{\text{sen}x}{\text{cos}x}$	$\cos(a + b) = \cos a \cos b - \sin a \sin b$
$1 + \frac{1}{\tan^2 x} = \frac{1}{\sin^2 x}$	$\cos(a - b) = \cos a \cos b + \sin a \sin b$
$1 + \tan^2 x = \frac{1}{\cos^2 x}$	$\sin(a + b) = \sin a \cos b + \sin b \cos a$
$\cos(2a) = \cos^2 a - \sin^2 a$	$\sin(a - b) = \sin a \cos b - \sin b \cos a$
$\sin(2a) = 2 \sin a \cos a$	$\tan(a + b) = \frac{\tan a + \tan b}{1 - \tan a \tan b}$
$\tan(2a) = \frac{2 \tan a}{1 - \tan^2 a}$	$\tan(a - b) = \frac{\tan a - \tan b}{1 + \tan a \tan b}$

Simplificar expressões trigonométricas - Redução ao primeiro quadrante

Para $a = \frac{\pi}{2}$	$\sin(\frac{\pi}{2} - \alpha) = \cos \alpha$	$\sin(\frac{\pi}{2} + \alpha) = \cos \alpha$
	$\cos(\frac{\pi}{2} - \alpha) = \sin \alpha$	$\cos(\frac{\pi}{2} + \alpha) = -\sin \alpha$
	$\text{tg}(\frac{\pi}{2} - \alpha) = \frac{1}{\tan \alpha}$	$\tan(\frac{\pi}{2} + \alpha) = -\frac{1}{\tan \alpha}$
Para $a = \pi$	$\sin(\pi - \alpha) = \sin \alpha$	$\sin(\pi + \alpha) = -\sin \alpha$
	$\cos(\pi - \alpha) = -\cos \alpha$	$\cos(\pi + \alpha) = -\cos \alpha$
	$\tan(\pi - \alpha) = -\tan \alpha$	$\tan(\pi + \alpha) = \tan \alpha$
Para $a = \frac{3\pi}{2}$	$\sin(\frac{3\pi}{2} - \alpha) = -\cos \alpha$	$\sin(\frac{3\pi}{2} + \alpha) = -\cos \alpha$
	$\cos(\frac{3\pi}{2} - \alpha) = -\sin \alpha$	$\cos(\frac{3\pi}{2} + \alpha) = \sin \alpha$
	$\tan(\frac{3\pi}{2} - \alpha) = \frac{1}{\tan \alpha}$	$\tan(\frac{3\pi}{2} + \alpha) = -\frac{1}{\tan \alpha}$

### Equações trigonométricas

1.  $\sin x = \sin \alpha \Leftrightarrow x = \alpha + 2k\pi \vee x = \pi - \alpha + 2k\pi, k \in \mathbb{Z}$
2.  $\cos x = \cos \alpha \Leftrightarrow x = \alpha + 2k\pi \vee x = -\alpha + 2k\pi, k \in \mathbb{Z}$
3.  $\tan x = \tan \alpha \Leftrightarrow x = \alpha + k\pi, k \in \mathbb{Z}$

### Derivadas das funções trigonométricas

- $(\sin u)' = u' \cos u$
- $(\cos u)' = -u' \sin u$
- $(\tan u)' = \frac{u'}{\cos^2 u}$

### Tabela trigonométrica

	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$
coosseno	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
seno	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$
tangente	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$

### Limite Notável

$$\lim_{x \rightarrow 0} \frac{\sin x}{x}$$