Fórmula fundamental: $(\text{sen } x)^2 + (\cos x)^2 = 1$

$\text{sen } 2x = 2.\text{sen } x.\cos x$ $\quad\quad$ $\cos 2x = (\cos x)^2 - (\text{sen } x)^2$

11.2. TABLA DE FÓRMULAS TRIGONOMÉTRICAS

$\text{sen}\,\alpha = \cos(90-\alpha)$
$\cos\alpha = \text{sen}(90-\alpha)$
$\text{tg}\,\alpha = \text{cotg}(90-\alpha)$

$\text{sen}\,\alpha = -\cos(90+\alpha)$
$\cos\alpha = \text{sen}(90+\alpha)$
$\text{tg}\,\alpha = -\text{cotg}(90+\alpha)$

$\text{sen}\,\alpha = -\text{sen}(-\alpha)$
$\cos\alpha = \cos(-\alpha)$
$\text{tg}\,\alpha = -\text{tg}(-\alpha)$

$\text{sen}\,\alpha = \text{sen}(180-\alpha)$
$\cos\alpha = -\cos(180-\alpha)$
$\text{tg}\,\alpha = -\text{tg}(180-\alpha)$

$\text{sen}\,\alpha = \text{sen}(2k\pi+\alpha)\ k\in\mathbb{Z}$
$\cos\alpha = \cos(2k\pi+\alpha)\ k\in\mathbb{Z}$
$\text{tg}\,\alpha = \text{tg}(2k\pi+\alpha)\ k\in\mathbb{Z}$

$\text{sen}\,\alpha = -\text{sen}(180+\alpha)$
$\cos\alpha = -\cos(180+\alpha)$
$\text{tg}\,\alpha = \text{tg}(180+\alpha)$

SUMA Y DIFERENCIA DE ÁNGULOS

$\text{sen}(\alpha+\beta) = \text{sen}\,\alpha.\cos\beta + \text{sen}\,\beta.\cos\alpha$

$\text{sen}(\alpha-\beta) = \text{sen}\,\alpha.\cos\beta - \text{sen}\,\beta.\cos\alpha$

$\cos(\alpha+\beta) = \cos\alpha.\cos\beta - \text{sen}\,\beta.\text{sen}\,\alpha$

$\cos(\alpha-\beta) = \cos\alpha.\cos\beta + \text{sen}\,\beta.\text{sen}\,\alpha$

$$\text{tg}(\alpha+\beta) = \frac{\text{tg}\,\alpha + \text{tg}\,\beta}{1 - \text{tg}\,\alpha\,.\,\text{tg}\,\beta}$$

$$\text{tg}(\alpha-\beta) = \frac{\text{tg}\,\alpha - \text{tg}\,\beta}{1 + \text{tg}\,\alpha\,.\,\text{tg}\,\beta}$$

ÁNGULOS DOBLES

$\text{sen}\,2\alpha = 2.\text{sen}\,\alpha.\cos\alpha$

$\cos 2\alpha = (\cos\alpha)^2 - (\text{sen}\,\alpha)^2$

$$\text{tg}\,2\alpha = \frac{2.\text{tg}\,\alpha}{1-(\text{tg}\,\alpha)^2}$$

ÁNGULOS TRIPLES

$\text{sen}\,3\alpha = 3.\text{sen}\,\alpha - 4(\text{sen}\,\alpha)^3$

$\cos 3\alpha = 4(\cos\alpha)^3 - 3.\cos\alpha$

$$\text{tg}\,3\alpha = \frac{3\,\text{tg}\,\alpha - (\text{tg}\,\alpha)^3}{1 - 3(\text{tg}\,\alpha)^2}$$

FÓRMULAS DE FACTOREO

$$\text{sen}\,\alpha + \text{sen}\,\beta = 2\,\text{sen}\left(\frac{\alpha+\beta}{2}\right).\cos\left(\frac{\alpha-\beta}{2}\right)$$

$$\text{sen}\,\alpha - \text{sen}\,\beta = 2\cos\left(\frac{\alpha+\beta}{2}\right).\text{sen}\left(\frac{\alpha-\beta}{2}\right)$$

$$\cos\alpha + \cos\beta = 2\cos\left(\frac{\alpha+\beta}{2}\right).\cos\left(\frac{\alpha-\beta}{2}\right)$$

$$\cos\alpha - \cos\beta = -2\,\text{sen}\left(\frac{\alpha+\beta}{2}\right).\text{sen}\left(\frac{\alpha-\beta}{2}\right)$$

$$\text{tg}\,\alpha + \text{tg}\,\beta = \frac{\text{sen}(\alpha+\beta)}{\cos\alpha.\cos\beta}$$

$$\text{tg}\,\alpha - \text{tg}\,\beta = \frac{\text{sen}(\alpha-\beta)}{\cos\alpha.\cos\beta}$$

ÁNGULOS MITAD

En estas fórmulas, delante del signo de raíz cuadrada deben ponerse los signos + o − según en qué cuadrante se encuentre el ángulo.

$$\text{sen}\left(\frac{\alpha}{2}\right) = \sqrt{\frac{1 - \cos\alpha}{2}}$$

$$\cos\left(\frac{\alpha}{2}\right) = \sqrt{\frac{1 + \cos\alpha}{2}}$$

$$\text{tg}\left(\frac{\alpha}{2}\right) = \sqrt{\frac{1 - \cos\alpha}{1 + \cos\alpha}} = \frac{1 - \cos\alpha}{\text{sen}\,\alpha}$$

ÁNGULOS CUÁDRUPLES

$$\text{sen}\,4\alpha = 8(\cos\alpha)^3.\text{sen}\,\alpha - 4.\cos\alpha.\text{sen}\,\alpha$$

$$\cos 4\alpha = 8(\cos\alpha)^4 - 8(\cos\alpha)^2. + 1$$

$$\text{tg}\,4\alpha = \frac{4.\text{tg}\,\alpha - 4.(\text{tg}\,\alpha)^3}{1 - 6.(\text{tg}\,\alpha)^2 + (\text{tg}\,\alpha)^4}$$

TANGENTE DEL ARCO MITAD

$$\text{sen}\,\alpha = \frac{2.\text{tg}\left(\frac{\alpha}{2}\right)}{1 + \left(\text{tg}\left(\frac{\alpha}{2}\right)\right)^2}$$

$$\cos\alpha = \frac{1 - \left(\text{tg}\left(\frac{\alpha}{2}\right)\right)^2}{1 + \left(\text{tg}\left(\frac{\alpha}{2}\right)\right)^2}$$

PRODUCTO DE FUNCIONES

$$\text{sen}\,\alpha\,.\,\text{sen}\,\beta = \frac{\cos(\alpha-\beta) - \cos(\alpha+\beta)}{2}$$

$$\cos\alpha\,.\,\cos\beta = \frac{\cos(\alpha-\beta) + \cos(\alpha+\beta)}{2}$$

$$\text{sen}\,\alpha\,.\,\cos\beta = \frac{\text{sen}(\alpha-\beta) + \text{sen}(\alpha+\beta)}{2}$$

VALORES EXACTOS DE LAS FUNCIONES SENO COSENO TANGENTE

Angulo α en grados	Angulo α en radianes	sen α	cos α	tg α
0º	0	0	1	0
15º	$\frac{\pi}{12}$	$\frac{(\sqrt{6}-\sqrt{2})}{4}$	$\frac{(\sqrt{6}+\sqrt{2})}{4}$	$2-\sqrt{3}$
30º	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
45º	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60º	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
75º	$\frac{5\pi}{12}$	$\frac{(\sqrt{6}+\sqrt{2})}{4}$	$\frac{(\sqrt{6}-\sqrt{2})}{4}$	$2+\sqrt{3}$
90º	$\frac{\pi}{2}$	1	0	$\nexists$
105º	$\frac{7\pi}{12}$	$\frac{(\sqrt{6}+\sqrt{2})}{4}$	$\frac{-(\sqrt{6}-\sqrt{2})}{4}$	$-(2+\sqrt{3})$
120º	$\frac{2\pi}{3}$	$\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$-\sqrt{3}$
135º	$\frac{3\pi}{4}$	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	-1
150º	$\frac{5\pi}{6}$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{3}$
165º	$\frac{11\pi}{12}$	$\frac{(\sqrt{6}-\sqrt{2})}{4}$	$\frac{-(\sqrt{6}+\sqrt{2})}{4}$	$-(2-\sqrt{3})$
180º	π	0	-1	0
195º	$\frac{13\pi}{12}$	$\frac{-(\sqrt{6}-\sqrt{2})}{4}$	$\frac{-(\sqrt{6}+\sqrt{2})}{4}$	$2-\sqrt{3}$
210º	$\frac{7\pi}{6}$	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
225º	$\frac{5\pi}{4}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	1
240º	$\frac{4\pi}{3}$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$\sqrt{3}$
255º	$\frac{17\pi}{12}$	$\frac{-(\sqrt{6}+\sqrt{2})}{4}$	$\frac{-(\sqrt{6}-\sqrt{2})}{4}$	$(2+\sqrt{3})$
270º	$\frac{3\pi}{2}$	-1	0	$\nexists$
285º	$\frac{19\pi}{12}$	$\frac{-(\sqrt{6}+\sqrt{2})}{4}$	$\frac{(\sqrt{6}-\sqrt{2})}{4}$	$-(2+\sqrt{3})$
300º	$\frac{5\pi}{3}$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$-\sqrt{3}$
315º	$\frac{7\pi}{4}$	$-\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	-1
330º	$\frac{11\pi}{6}$	$-\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{3}$
345º	$\frac{23\pi}{12}$	$\frac{-(\sqrt{6}-\sqrt{2})}{4}$	$\frac{(\sqrt{6}+\sqrt{2})}{4}$	$-(2-\sqrt{3})$
360º	2π	0	1	0