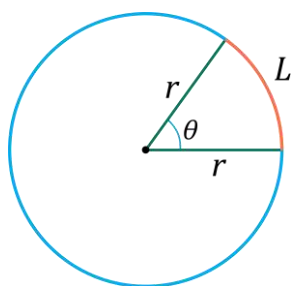


MEDIDA DE UN ÁNGULO



$$L = \theta r$$

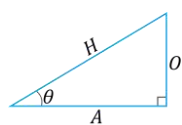
$$180^\circ = 200^g = \pi \text{ rad}$$

$$\frac{S}{180^\circ} = \frac{C}{200^\circ} = \frac{R}{\pi \text{ rad}}$$

$$1^\circ = \frac{\pi}{180} \text{ rad}$$

$$1 \text{ rad} = \frac{180^\circ}{\pi}$$

TRIGONOMETRÍA DE ÁNGULO RECTO (SOH-CAH-TOA)



$$S \frac{O}{H}$$

$$C \frac{A}{H}$$

$$T \frac{O}{A}$$

$$\sin \theta = \frac{O}{H}$$

$$\cos \theta = \frac{A}{H}$$

$$\tan \theta = \frac{O}{A}$$

$$\csc \theta = \frac{H}{O}$$

$$\sec \theta = \frac{H}{A}$$

$$\cot \theta = \frac{A}{O}$$

O = cateto Opuesto

A = cateto Adyacente

H = Hipotenusa

S = seno

C = coseno

T = tangente

¿PROBLEMAS CON TRIGONOMETRÍA?

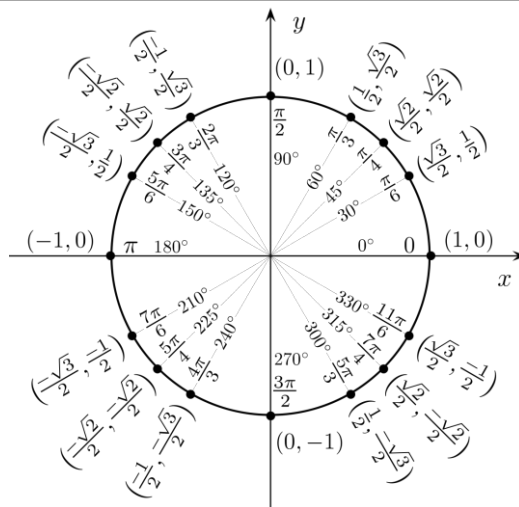
Si quieres aprender trigonometría, dale un vistazo a nuestro curso virtual, con cientos de ejercicios resueltos y explicaciones detalladas.



RAZONES TRIGONOMÉTRICAS DE ÁNGULOS NOTABLES

θ	radianes	$\sin \theta$	$\cos \theta$	$\tan \theta$
0°	0	0	1	0
30°	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
45°	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60°	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
90°	$\frac{\pi}{2}$	1	0	—
180°	π	0	-1	0
270°	$\frac{3\pi}{2}$	-1	0	—
360°	0	0	1	0

CIRCUNFERENCIA TRIGONOMÉTRICA



$$\sin \theta = y$$

$$\cos \theta = x$$

$$\tan \theta = \frac{y}{x}$$

$$\csc \theta = \frac{1}{y}$$

$$\sec \theta = \frac{1}{x}$$

$$\cot \theta = \frac{x}{y}$$

IDENTIDADES DE TANGENTE Y COTANGENTE

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$

IDENTIDADES RECÍPROCAS

$$\csc \theta = \frac{1}{\sin \theta}$$

$$\sin \theta = \frac{1}{\csc \theta}$$

$$\sec \theta = \frac{1}{\cos \theta}$$

$$\cos \theta = \frac{1}{\sec \theta}$$

$$\cot \theta = \frac{1}{\tan \theta}$$

$$\tan \theta = \frac{1}{\cot \theta}$$

IDENTIDADES PITAGÓRICAS

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

$$\tan^2 \theta + 1 = \sec^2 \theta$$

$$\cot^2 \theta + 1 = \csc^2 \theta$$

IDENTIDADES PAR / IMPAR

$$\sin(-\theta) = -\sin \theta$$

$$\csc(-\theta) = -\csc \theta$$

$$\cos(-\theta) = \cos \theta$$

$$\sec(-\theta) = \sec \theta$$

$$\tan(-\theta) = -\tan \theta$$

$$\cot(-\theta) = -\cot \theta$$

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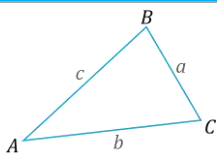


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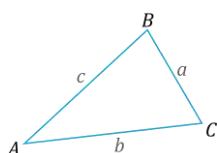
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LEY DE SENOS



$$\frac{\text{sen } A}{a} = \frac{\text{sen } B}{b} = \frac{\text{sen } C}{c}$$

LEY DE COSENOS

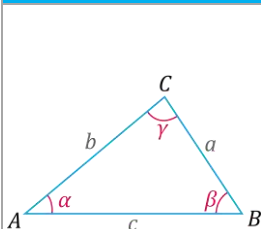


$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$

LEY DE TANGENTES



$$\frac{a-b}{a+b} = \frac{\tan \left[\frac{1}{2}(\alpha - \beta) \right]}{\tan \left[\frac{1}{2}(\alpha + \beta) \right]}$$

$$\frac{b-c}{b+c} = \frac{\tan \left[\frac{1}{2}(\beta - \gamma) \right]}{\tan \left[\frac{1}{2}(\beta + \gamma) \right]}$$

$$\frac{a-c}{a+c} = \frac{\tan \left[\frac{1}{2}(\alpha - \gamma) \right]}{\tan \left[\frac{1}{2}(\alpha + \gamma) \right]}$$

IDENTIDADES DE SUMA A PRODUCTO

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

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

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

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

IDENTIDADES DE PRODUCTO A SUMA

$$\text{sen } \alpha \text{ sen } \beta = \frac{1}{2} [\cos(\alpha - \beta) - \cos(\alpha + \beta)]$$

$$\cos \alpha \cos \beta = \frac{1}{2} [\cos(\alpha - \beta) + \cos(\alpha + \beta)]$$

$$\text{sen } \alpha \cos \beta = \frac{1}{2} [\text{sen}(\alpha + \beta) + \text{sen}(\alpha - \beta)]$$

$$\cos \alpha \text{ sen } \beta = \frac{1}{2} [\text{sen}(\alpha + \beta) - \text{sen}(\alpha - \beta)]$$

IDENTIDADES DE SUMA Y DIFERENCIA

$$\text{sen}(\alpha \pm \beta) = \text{sen } \alpha \cos \beta \pm \cos \alpha \text{ sen } \beta$$

$$\cos(\alpha \pm \beta) = \cos \alpha \cos \beta \mp \text{sen } \alpha \text{ sen } \beta$$

$$\tan(\alpha \pm \beta) = \frac{\tan \alpha \pm \tan \beta}{1 \mp \tan \alpha \tan \beta}$$

IDENTIDADES PERIÓDICAS

$$\text{sen}(\theta + 2\pi n) = \text{sen } \theta$$

$$\csc(\theta + 2\pi n) = \csc \theta$$

$$\cos(\theta + 2\pi n) = \cos \theta$$

$$\sec(\theta + 2\pi n) = \sec \theta$$

$$\tan(\theta + \pi n) = \tan \theta$$

$$\cot(\theta + \pi n) = \cot \theta$$

IDENTIDADES DE COFUNCIONES

$$\text{sen} \left(\frac{\pi}{2} - \theta \right) = \cos \theta$$

$$\csc \left(\frac{\pi}{2} - \theta \right) = \sec \theta$$

$$\tan \left(\frac{\pi}{2} - \theta \right) = \cot \theta$$

$$\cos \left(\frac{\pi}{2} - \theta \right) = \text{sen } \theta$$

$$\sec \left(\frac{\pi}{2} - \theta \right) = \csc \theta$$

$$\cot \left(\frac{\pi}{2} - \theta \right) = \tan \theta$$

FÓRMULAS DEL ÁNGULO DOBLE

$$\text{sen}(2\theta) = 2 \text{sen } \theta \cos \theta$$

$$\begin{aligned} \cos(2\theta) &= \cos^2 \theta - \text{sen}^2 \theta \\ &= 2 \cos^2 \theta - 1 \\ &= 1 - 2 \text{sen}^2 \theta \end{aligned}$$

$$\tan(2\theta) = \frac{2 \tan \theta}{1 - \tan^2 \theta}$$

FÓRMULAS DEL ÁNGULO MITAD

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

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

$$\tan \left(\frac{\theta}{2} \right) = \pm \sqrt{\frac{1 - \cos \theta}{1 + \cos \theta}}$$

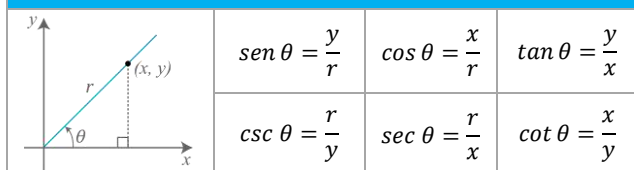
FÓRMULAS DEL ÁNGULO TRIPLE

$$\text{sen}(3\theta) = 3 \text{sen } \theta - 4 \text{sen}^3 \theta$$

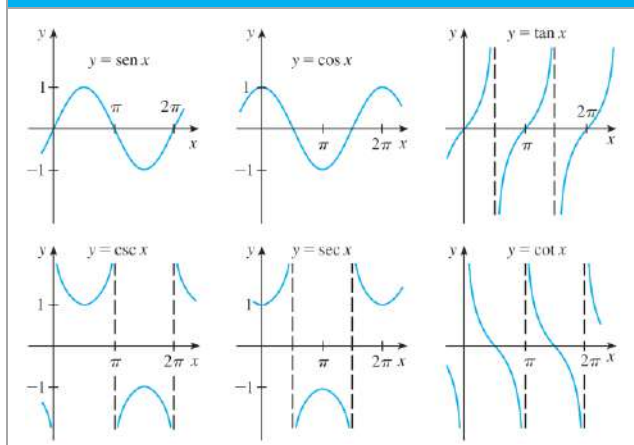
$$\cos(3\theta) = 4 \cos^3 \theta - 3 \cos \theta$$

$$\tan(3\theta) = \frac{3 \tan \theta - \tan^3 \theta}{1 - 3 \tan^2 \theta}$$

FUNCIONES TRIGONOMÉTRICAS



GRÁFICAS DE FUNCIONES TRIGONOMÉTRICAS



DOMINIO DE FUNCIONES TRIGONOMÉTRICAS

$\sin \theta$,	θ puede tomar cualquier valor real
$\cos \theta$,	θ puede tomar cualquier valor real
$\tan \theta$,	$\theta \neq \left(n + \frac{1}{2}\right)\pi$, $n = 0, \pm 1, \pm 2, \pm 3, \dots$
$\csc \theta$,	$\theta \neq n\pi$, $n = 0, \pm 1, \pm 2, \pm 3, \dots$
$\sec \theta$,	$\theta \neq \left(n + \frac{1}{2}\right)\pi$, $n = 0, \pm 1, \pm 2, \pm 3, \dots$
$\cot \theta$,	$\theta \neq n\pi$, $n = 0, \pm 1, \pm 2, \pm 3, \dots$

RANGO DE FUNCIONES TRIGONOMÉTRICAS

$-1 \leq \sin x \leq +1$	$-1 \leq \cos x \leq +1$	$-\infty \leq \tan x \leq \infty$
$\csc x \leq -1 \vee \csc x \geq 1$	$\sec x \leq -1 \vee \sec x \geq 1$	$-\infty \leq \cot x \leq \infty$

PERÍODO DE FUNCIONES TRIGONOMÉTRICAS

$\sin(\omega\theta) \rightarrow T = \frac{2\pi}{\omega}$
$\cos(\omega\theta) \rightarrow T = \frac{2\pi}{\omega}$
$\tan(\omega\theta) \rightarrow T = \frac{\pi}{\omega}$
$\csc(\omega\theta) \rightarrow T = \frac{2\pi}{\omega}$
$\sec(\omega\theta) \rightarrow T = \frac{2\pi}{\omega}$
$\cot(\omega\theta) \rightarrow T = \frac{\pi}{\omega}$

ESTUDIA CON NOSOTROS

Si quieres aprender mates, dale un vistazo a nuestro canal: Matemóvil.



NOTACIÓN DE FUNCIONES INVERSAS

$\sin^{-1}x \equiv \arcsen x \equiv A \sin x$
$\cos^{-1}x \equiv \arccos x \equiv A \cos x$
$\tan^{-1}x \equiv \arctan x \equiv A \tan x$

DOMINIO DE FUNCIONES INVERSAS

$\sin^{-1}x: -1 \leq x \leq +1$
$\cos^{-1}x: -1 \leq x \leq +1$
$\tan^{-1}x: -\infty \leq x \leq \infty$

RANGO DE FUNCIONES INVERSAS

$-\frac{\pi}{2} \leq \sin^{-1}x \leq \frac{\pi}{2}$
$0 \leq \cos^{-1}x \leq \pi$
$-\frac{\pi}{2} \leq \tan^{-1}x \leq \frac{\pi}{2}$

Versión 1.00
Fórmulas: Danna.
Gráficas: Jorge.

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