Formulario de trigonometría

Medida de ángulos

$2\pi \; rad \to 360^\circ \to 400^g$

Radianes a grados

$\alpha(rad) = \frac{2\pi}{360}\alpha(^\circ)$

Grados a radianes

$\alpha(rad) = \frac{2\pi}{400}\alpha(^g)$

Longitud de arco (Ángulo en radianes)

$L = R \cdot \alpha$

Relaciones fundamentales

Inversas

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

$\operatorname{cosec}\alpha = \frac{1}{\operatorname{sen}\alpha}$

$\operatorname{cotg}\alpha = \frac{1}{\operatorname{tg}\alpha}$

Fundamentales

$\operatorname{tg}\alpha = \frac{\operatorname{sen}\alpha}{\cos\alpha}$

$\operatorname{sen}^2\alpha + \cos^2\alpha = 1$

$\operatorname{tg}^2\alpha + 1 = \sec^2\alpha$

$1 + \operatorname{cotg}^2\alpha = \operatorname{cosec}^2\alpha$

Ángulos relacionados

Ángulos complementarios (α+β=90°)

$\operatorname{sen}\alpha = \cos(90^\circ - \alpha)$ $\quad$ $\operatorname{sen}(90^\circ - \alpha) = \cos\alpha$

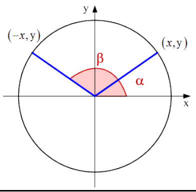
$\operatorname{tg}\alpha = \operatorname{cotg}(90^\circ - \alpha)$ $\quad$ $\operatorname{tg}(90^\circ - \alpha) = \operatorname{cotg}\alpha$

$\sec\alpha = \operatorname{cosec}(90^\circ - \alpha)$ $\quad$ $\sec(90^\circ - \alpha) = \operatorname{cosec}\alpha$

Ángulos suplementarios (α+β=180°)

$\operatorname{sen}(180^\circ - \alpha) = \operatorname{sen}\alpha$

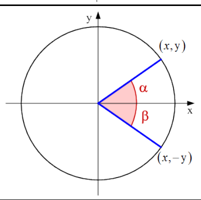
$\cos(180^\circ - \alpha) = -\cos\alpha$



Ángulos opuestos

$\operatorname{sen}\alpha = -\operatorname{sen}(-\alpha)$

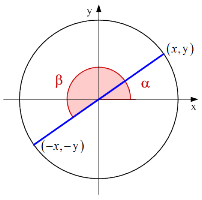
$\cos\alpha = \cos(-\alpha)$



Ángulos que difieren en 180°

$\operatorname{sen}(180^\circ + \alpha) = -\operatorname{sen}\alpha$

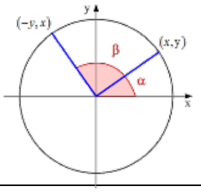
$\cos(180^\circ + \alpha) = -\cos\alpha$



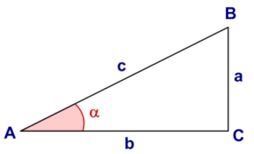
Ángulos que difieren en 90°

$\operatorname{sen}(90^\circ + \alpha) = \cos\alpha$

$\cos(90^\circ + \alpha) = -\operatorname{sen}\alpha$



Razones trigonometricas de un ángulo agudo



Funciones

$\operatorname{sen}\alpha = \frac{cat.\,opuesto}{hipotenusa} = \frac{a}{c}$

$\operatorname{tg}\alpha = \frac{cat.\,opuesto}{cat.\,contiguo} = \frac{a}{b}$

$\sec\alpha = \frac{hipotenusa}{cat.\,contiguo} = \frac{c}{b}$

Cofunciones

$\cos\alpha = \frac{cat.\,contiguo}{hipotenusa} = \frac{b}{c}$

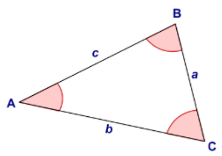
$\operatorname{cotg}\alpha = \frac{cat.\,contiguo}{cat.\,opuesto} = \frac{b}{a}$

$\operatorname{cosec}\alpha = \frac{hipotenusa}{cat.\,opuesto} = \frac{c}{a}$

Ángulos notables del 1° cuadrante

	0°	30°	45°	60°	90°
$\operatorname{sen}\alpha$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos\alpha$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
$\operatorname{tg}\alpha$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	∞

Resolución de triángulos cualesquiera



Teorema del seno

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

Teorema del coseno

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

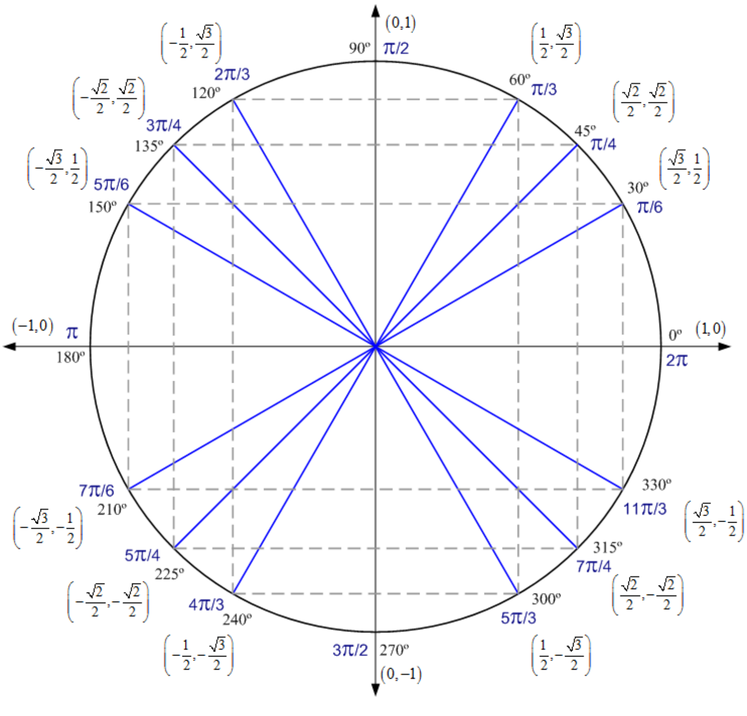
$b^2 = a^2 + c^2 - 2ac \cdot \cos B$

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

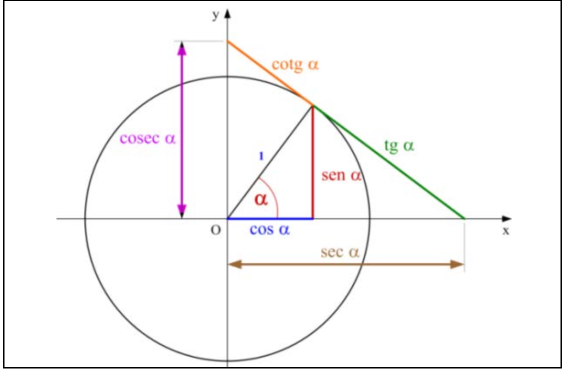
Teorema de la tangente

$$\frac{a-b}{a+b} = \frac{\operatorname{tg}\left(\frac{A-B}{2}\right)}{\operatorname{tg}\left(\frac{A+B}{2}\right)}$$

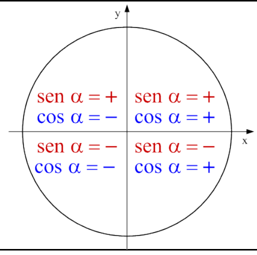
Circunferencia Goniométrica



Interpretación geométrica



Signo de las razones trigonométricas



Razones trigonometricas de la suma

$$\operatorname{sen}(\alpha+\beta)=\operatorname{sen}\alpha\cdot\cos\beta+\operatorname{sen}\beta\cdot\cos\alpha$$

$$\cos(\alpha+\beta)=\cos\alpha\cdot\cos\beta-\operatorname{sen}\alpha\cdot\operatorname{sen}\beta$$

$$\operatorname{tg}(\alpha+\beta)=\frac{\operatorname{tg}\alpha+\operatorname{tg}\beta}{1-\operatorname{tg}\alpha\cdot\operatorname{tg}\beta}$$

Razones del ángulo doble

$$\operatorname{sen}(2\alpha)=2\operatorname{sen}\alpha\cdot\cos\alpha$$

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

$$\operatorname{tg}(2\alpha)=\frac{2\operatorname{tg}\alpha}{1-\operatorname{tg}^2\alpha}$$

Razones trigonometricas de la diferencia

$$\operatorname{sen}(\alpha-\beta)=\operatorname{sen}\alpha\cdot\cos\beta-\operatorname{sen}\beta\cdot\cos\alpha$$

$$\cos(\alpha-\beta)=\cos\alpha\cdot\cos\beta+\operatorname{sen}\alpha\cdot\operatorname{sen}\beta$$

$$\operatorname{tg}(\alpha-\beta)=\frac{\operatorname{tg}\alpha-\operatorname{tg}\beta}{1+\operatorname{tg}\alpha\cdot\operatorname{tg}\beta}$$

Razones del ángulo mitad

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

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

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

Transformación de sumas a productos

$$\operatorname{sen}A+\operatorname{sen}B=2\operatorname{sen}\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right)$$

$$\operatorname{sen}A-\operatorname{sen}B=2\cos\left(\frac{A+B}{2}\right)\operatorname{sen}\left(\frac{A-B}{2}\right)$$

$$\cos A+\cos B=2\cos\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right)$$

$$\cos A-\cos B=-2\operatorname{sen}\left(\frac{A+B}{2}\right)\operatorname{sen}\left(\frac{A-B}{2}\right)$$

$$\operatorname{sen}^2\alpha-\operatorname{sen}^2\beta=\operatorname{sen}(\alpha+\beta)\operatorname{sen}(\alpha-\beta)$$

$$\cos^2\alpha-\operatorname{sen}^2\beta=\cos(\alpha+\beta)\cos(\alpha-\beta)$$

De productos a sumas

$$\operatorname{sen}A\cdot\cos B=\frac{1}{2}\left[\operatorname{sen}(A+B)+\operatorname{sen}(A-B)\right]$$

$$\cos A\cdot\operatorname{sen}B=\frac{1}{2}\left[\operatorname{sen}(A+B)-\operatorname{sen}(A-B)\right]$$

$$\cos A\cdot\cos B=\frac{1}{2}\left[\cos(A+B)+\cos(A-B)\right]$$

$$\operatorname{sen}A\cdot\operatorname{sen}B=-\frac{1}{2}\left[\cos(A+B)-\cos(A-B)\right]$$