

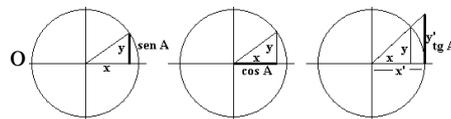
Trigonometría – Resumen de fórmulas

Razones trigonométricas

$$\sin \alpha = \frac{\text{cateto opuesto}}{\text{hipotenusa}}$$

$$\cos \alpha = \frac{\text{cateto contiguo}}{\text{hipotenusa}}$$

$$\tan \alpha = \frac{\text{cateto opuesto}}{\text{cateto contiguo}}$$

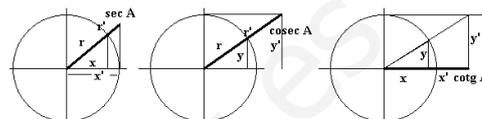


$$\tan \alpha = \frac{\sin \alpha}{\cos \alpha}$$

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

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

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



Relaciones Fundamentales

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

$$1 + \tan^2 \alpha = \frac{1}{\cos^2 \alpha}$$

Relaciones Pitagóricas

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

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

Relaciones entre las razones trigonométricas

Ángulos opuestos

$$\sin(-\alpha) = -\sin \alpha$$

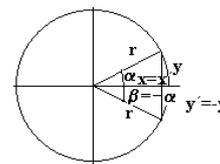
$$\cos(-\alpha) = \cos \alpha$$

$$\tan(-\alpha) = -\tan \alpha$$

$$\sin(360-\alpha) = -\sin \alpha$$

$$\cos(360-\alpha) = \cos \alpha$$

$$\tan(360-\alpha) = -\tan \alpha$$

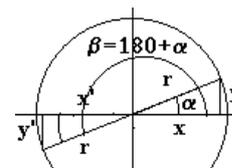
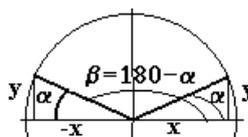


Ángulos suplementarios (180-alpha) y que difieren en 180 (180+alpha)

$$\sin(180 \mp \alpha) = \pm \sin \alpha$$

$$\cos(180 \mp \alpha) = -\cos \alpha$$

$$\tan(180 \mp \alpha) = \mp \tan \alpha$$

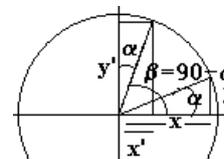


Ángulos complementarios (90-alpha) y que difieren en 90 (90+alpha)

$$\sin(90 \mp \alpha) = \cos \alpha$$

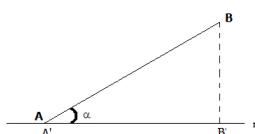
$$\cos(90 \mp \alpha) = \pm \sin \alpha$$

$$\tan(90 \mp \alpha) = \frac{\pm 1}{\tan \alpha}$$



Proyección del segmento AB sobre una recta r

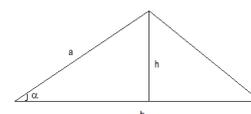
$$A'B' = AB \cos \alpha$$



Área de un triángulo

$$A = \frac{1}{2} ab \sin \alpha$$

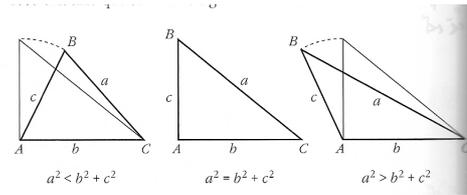
$$A = \frac{bh}{2}$$



Teorema de los senos (Sirve para cualquier tipo de triángulo)

$$\frac{a}{\sin \hat{A}} = \frac{b}{\sin \hat{B}} = \frac{c}{\sin \hat{C}}$$

Nota: a es el lado opuesto al ángulo A y así con el resto.



Teorema de los cosenos (Sirve para cualquier tipo de triángulo)

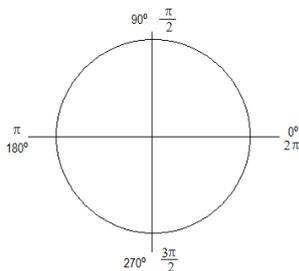
$$a^2 = b^2 + c^2 - 2bc \cos \hat{A}$$

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

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

Radián

La medida de un ángulo tal que el arco que abarca tiene la misma longitud que el radio con el que se ha trazado.



Razones trigonométricas de suma o resta de ángulos

$$\sin(\alpha \pm \beta) = \sin \alpha \cos \beta \pm \cos \alpha \sin \beta$$

$$\cos(\alpha \pm \beta) = \cos \alpha \cos \beta \mp \sin \alpha \sin \beta$$

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

Razones trigonométricas del ángulo doble

$$\sin(2\alpha) = 2 \sin \alpha \cos \alpha$$

$$\cos(2\alpha) = \cos^2 \alpha - \sin^2 \alpha$$

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

Razones trigonométricas del ángulo mitad

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

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

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

Sumas y Restas de senos y cosenos

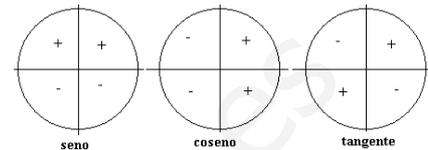
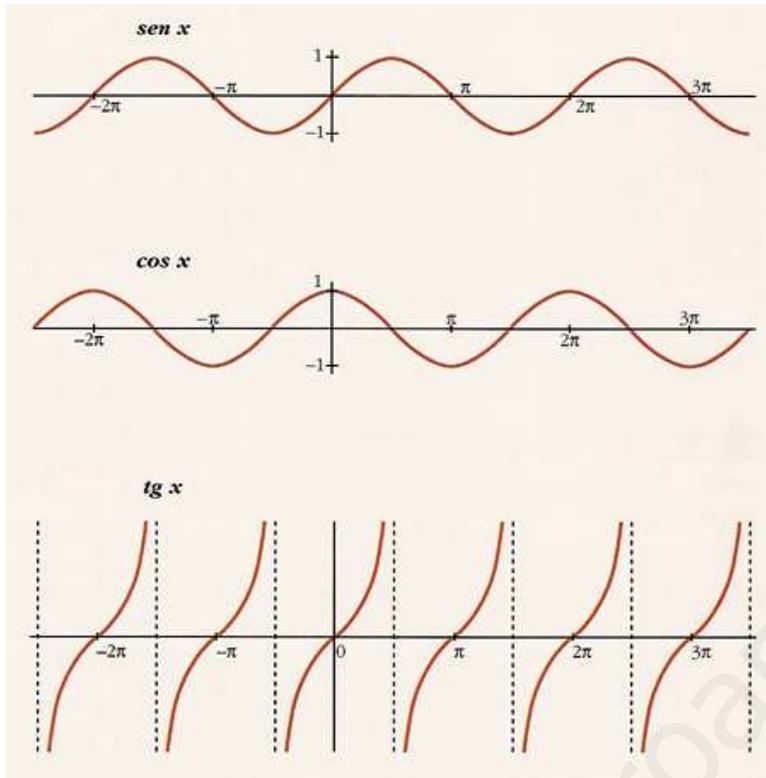
$$\sin A + \sin B = 2 \sin\left(\frac{A+B}{2}\right) \cdot \cos\left(\frac{A-B}{2}\right)$$

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

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

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

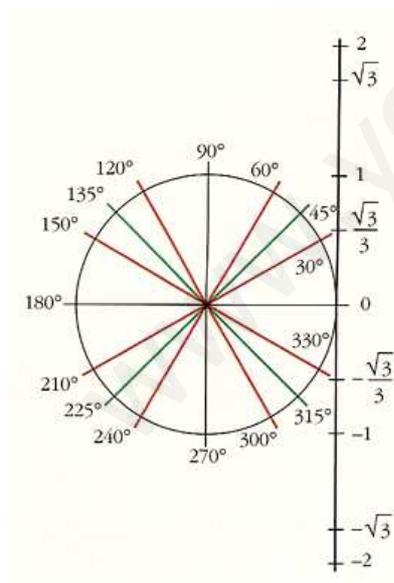
Funciones circulares definidas en todo R



Recuerda que $tg x$ no está definida en los puntos

$$x = \frac{\pi}{2} + n\pi \quad \text{donde } n \text{ es un número entero.}$$

Valores del sen, cos y tg usuales.



GRADOS	0°	30°	45°	60°	90°	120°	135°	150°
RADIANES	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$	$2\pi/3$	$3\pi/4$	$5\pi/6$
sen	0	1/2	$\sqrt{2}/2$	$\sqrt{3}/2$	1	$\sqrt{3}/2$	$\sqrt{2}/2$	1/2
cos	1	$\sqrt{3}/2$	$\sqrt{2}/2$	1/2	0	-1/2	$-\sqrt{2}/2$	$-\sqrt{3}/2$
tg	0	$\sqrt{3}/3$	1	$\sqrt{3}$	—	$-\sqrt{3}$	-1	$-\sqrt{3}/3$

GRADOS	180°	210°	225°	240°	270°	300°	315°	330°
RADIANES	π	$7\pi/6$	$5\pi/4$	$4\pi/3$	$3\pi/2$	$5\pi/3$	$7\pi/4$	$11\pi/6$
sen	0	-1/2	$-\sqrt{2}/2$	$-\sqrt{3}/2$	-1	$-\sqrt{3}/2$	$-\sqrt{2}/2$	-1/2
cos	-1	$-\sqrt{3}/2$	$-\sqrt{2}/2$	-1/2	0	1/2	$\sqrt{2}/2$	$\sqrt{3}/2$
tg	0	$\sqrt{3}/3$	1	$\sqrt{3}$	—	$-\sqrt{3}$	-1	$-\sqrt{3}/3$