

Trigonometría - Resumen de Fórmulas

Curso Álgebra Lineal

Razones trigonométricas

$$\sin(x) = \frac{\text{cateto opuesto}}{\text{hipotenusa}}$$

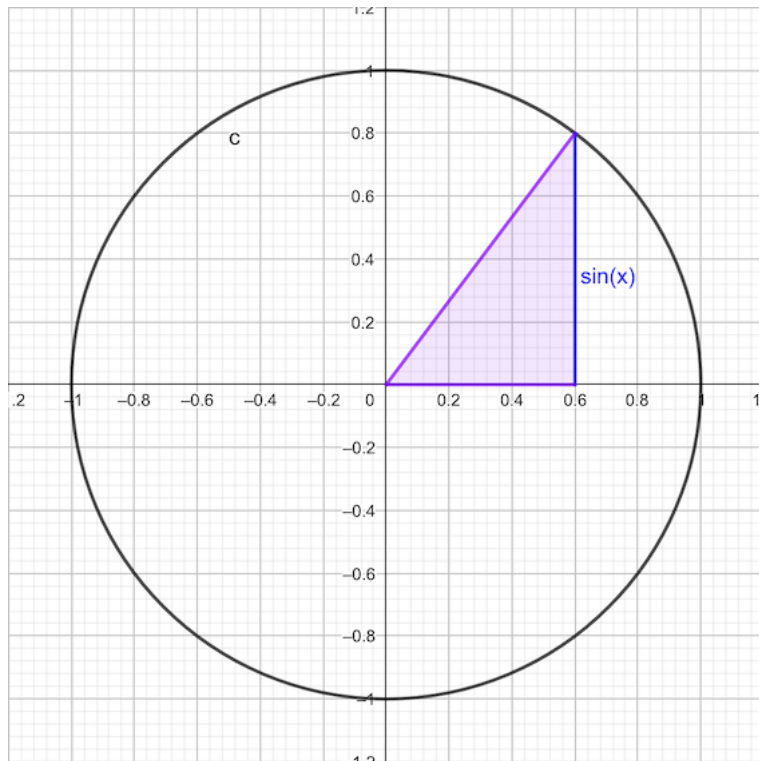


Figure 1: Representación gráfica del $\sin(x)$

$$\cos(x) = \frac{\text{cateto contiguo}}{\text{hipotenusa}}$$

$$\tan(x) = \frac{\text{cateto opuesto}}{\text{cateto contiguo}} = \frac{\sin(x)}{\cos(x)}$$

$$\csc(x) = \frac{1}{\sin(x)}$$

$$\sec(x) = \frac{1}{\cos(x)}$$

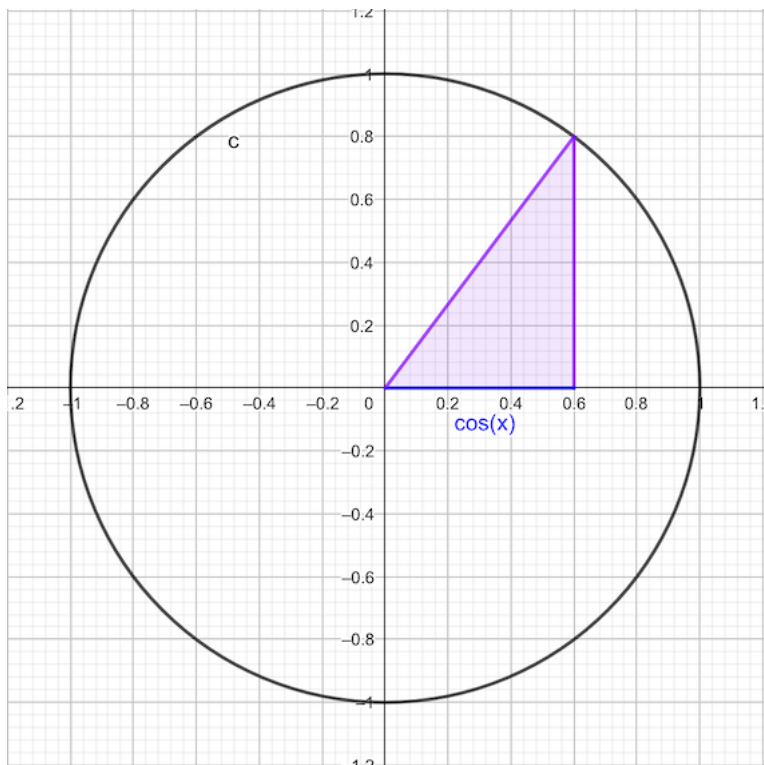


Figure 2: Representación gráfica del $\cos(x)$

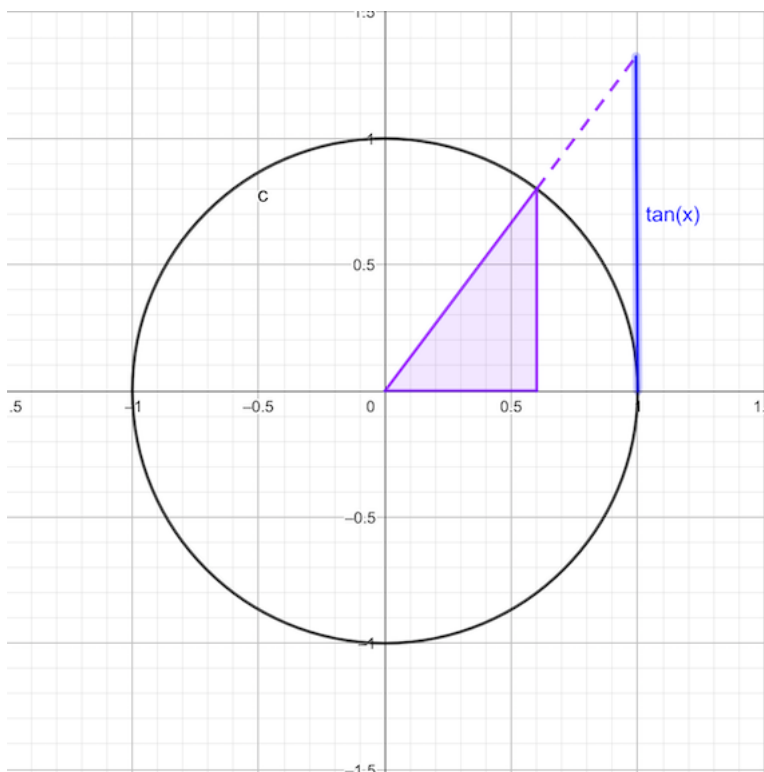


Figure 3: Representación gráfica de la $\tan(x)$

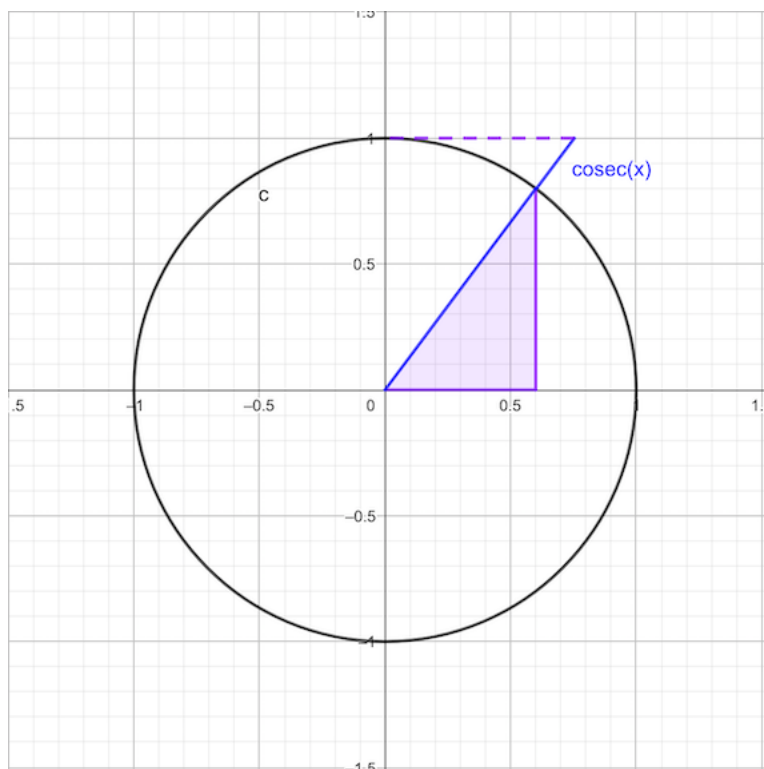


Figure 4: Representación gráfica de la $\csc(x)$

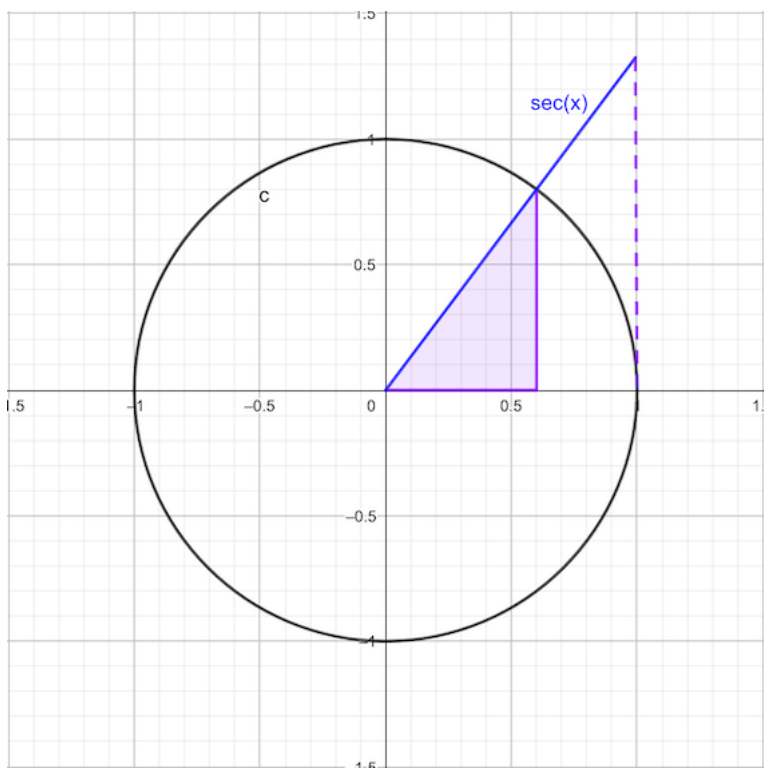


Figure 5: Representación gráfica de la $\sec(x)$

$$\cot(x) = \frac{1}{\tan(x)}$$

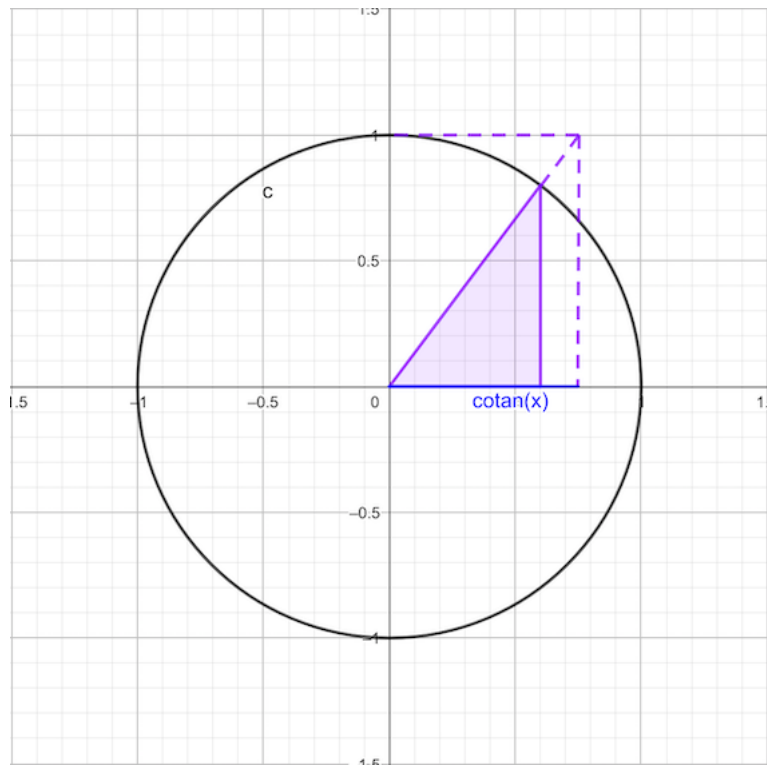


Figure 6: Representación gráfica de la $\cot(x)$

Relaciones fundamentales

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

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

Relaciones pitagóricas

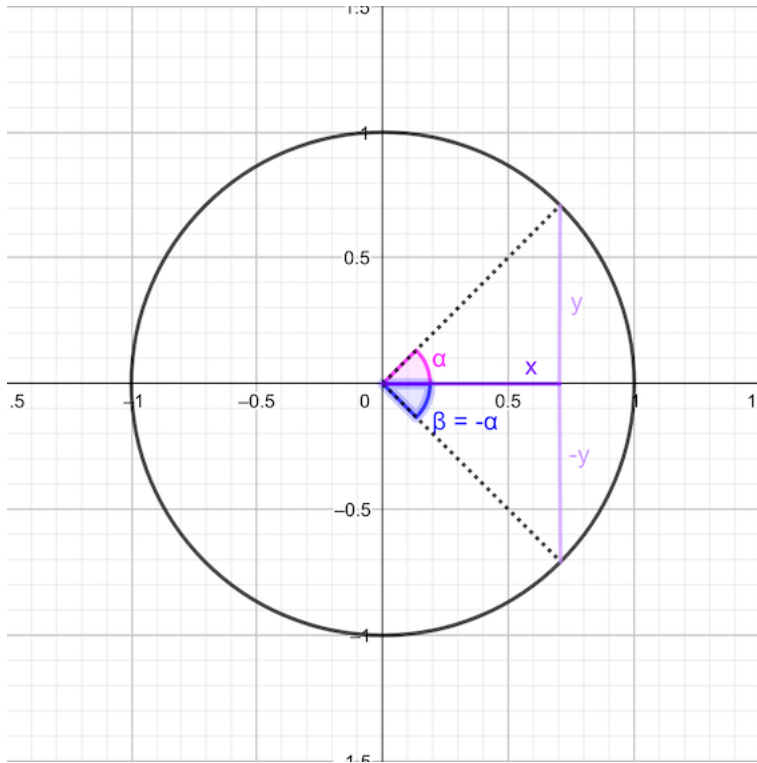
$$1 + \cot^2(\alpha) = \csc^2(\alpha)$$

$$1 + \tan^2(\alpha) = \sec^2(\alpha)$$

Relaciones entre las razones trigonométricas

Ángulos opuestos

$$\begin{array}{lll} \sin(-\alpha) = -\sin(\alpha) & \cos(-\alpha) = \cos(\alpha) & \tan(-\alpha) = -\tan(\alpha) \\ \sin(2\pi - \alpha) = -\sin(\alpha) & \cos(2\pi - \alpha) = \cos(\alpha) & \tan(2\pi - \alpha) = -\tan(\alpha) \end{array}$$

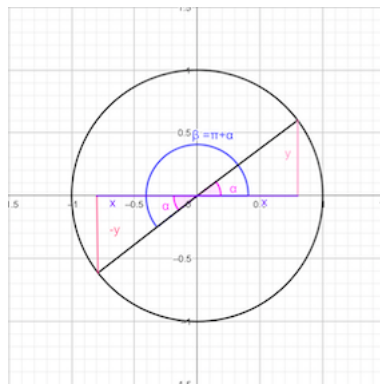
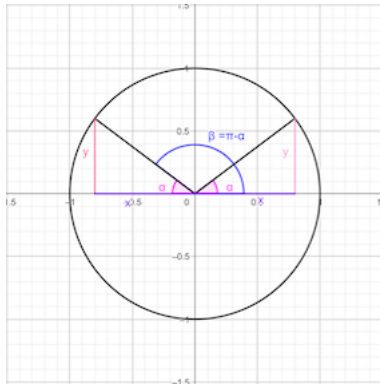


Ángulos suplementarios

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

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

$$\tan(\pi \pm \alpha) = \mp \tan(\alpha)$$

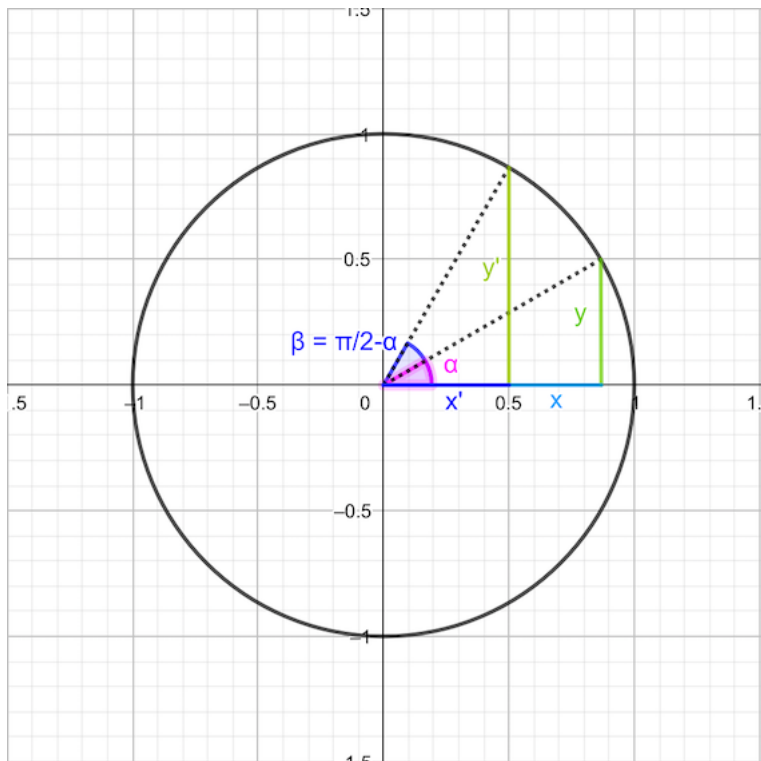


Ángulos complementarios

$$\sin\left(\frac{\pi}{2} \pm \alpha\right) = \cos(\alpha)$$

$$\cos\left(\frac{\pi}{2} \pm \alpha\right) = \mp \sin(\alpha)$$

$$\tan\left(\frac{\pi}{2} \pm \alpha\right) = \mp \frac{1}{\tan(\alpha)}$$



Suma o resta de ángulos

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

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

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

Ángulo doble

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

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

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

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

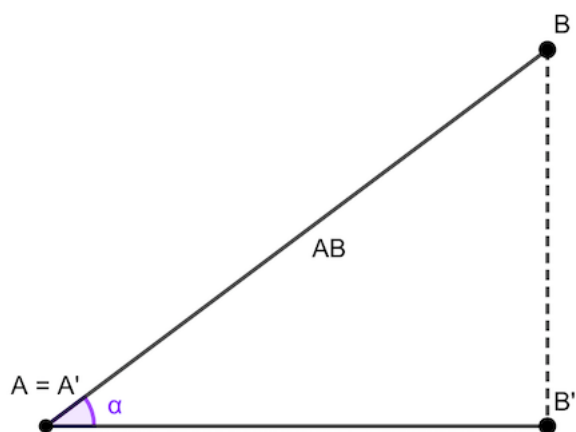
$$\begin{aligned}\sin(\alpha) + \sin(\beta) &= 2 \sin\left(\frac{\alpha+\beta}{2}\right) \cos\left(\frac{\alpha-\beta}{2}\right) & \sin(\alpha) - \sin(\beta) &= 2 \cos\left(\frac{\alpha+\beta}{2}\right) \sin\left(\frac{\alpha-\beta}{2}\right) \\ \cos(\alpha) + \cos(\beta) &= 2 \cos\left(\frac{\alpha+\beta}{2}\right) \cos\left(\frac{\alpha-\beta}{2}\right) & \cos(\alpha) - \cos(\beta) &= -2 \sin\left(\frac{\alpha+\beta}{2}\right) \sin\left(\frac{\alpha-\beta}{2}\right)\end{aligned}$$

Valores del seno, coseno y tangente usuales

Radianes	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
Grados	0°	30°	45°	60°	90°
sin	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
tan	0	$\frac{\sqrt{3}}{3}$	1	$\frac{3}{\sqrt{3}}$	∞

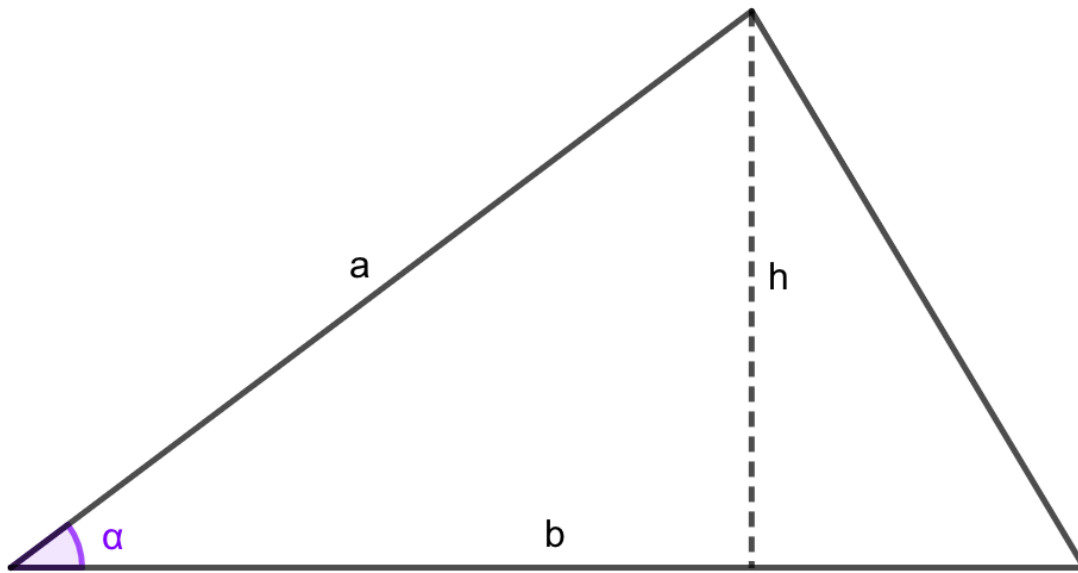
Proyección del segmento \overline{AB} sobre una recta r

$$\overline{A'B'} = \overline{AB} \cos(\alpha)$$



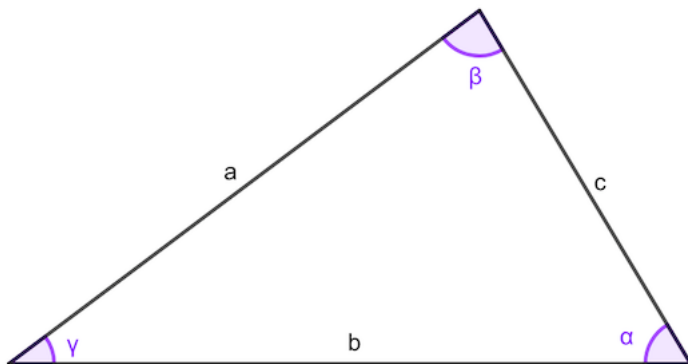
Área de un triángulo

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



Teorema de los senos

$$\frac{a}{\sin(\alpha)} = \frac{b}{\sin(\beta)} = \frac{c}{\sin(\gamma)}$$

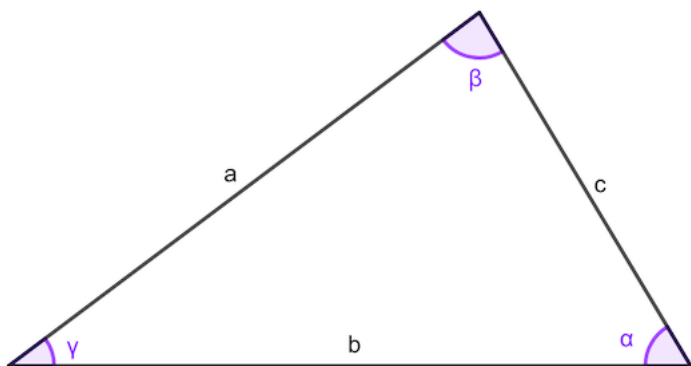


Teorema del coseno

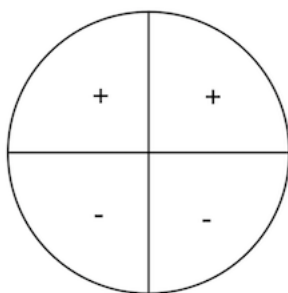
$$a^2 = b^2 + c^2 - 2bc \cos(\alpha)$$

$$b^2 = a^2 + c^2 - 2ac \cos(\beta)$$

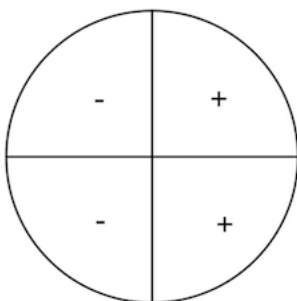
$$c^2 = a^2 + b^2 - 2ab \cos(\gamma)$$



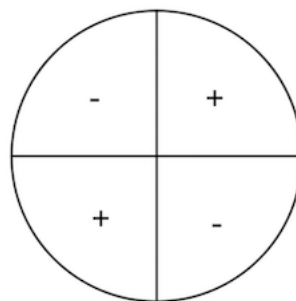
Más sobre seno, coseno y tangente



sin



cos



tan

