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itle: “Trigonometría - Resumen de Fórmulas”
uthor: “Curso Álgebra Lineal”
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Razones trigonométricas

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

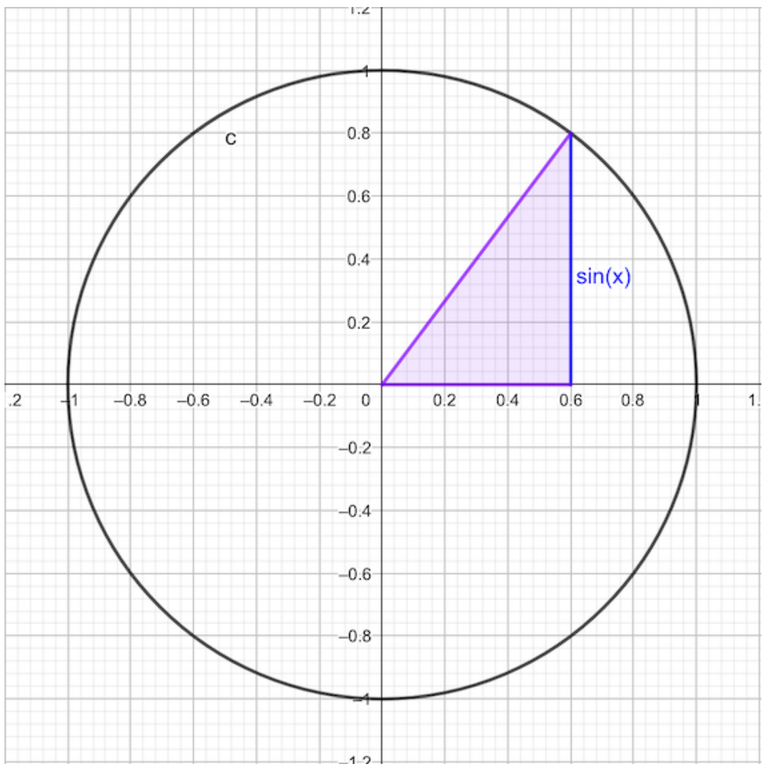


Figure 1: Representación gráfica del $\sin(x)$

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

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

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

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

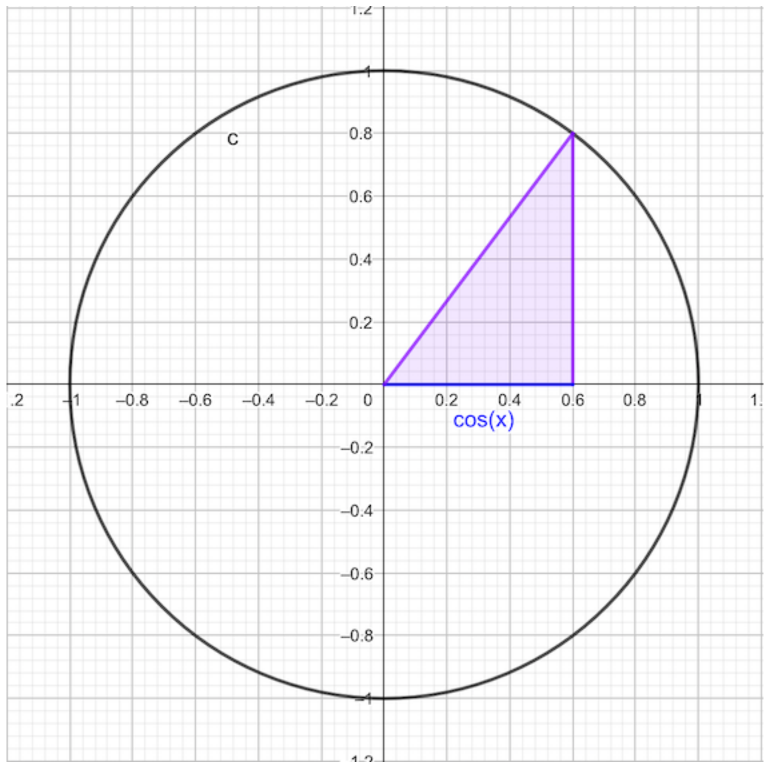


Figure 2: Representación gráfica del $\cos(x)$

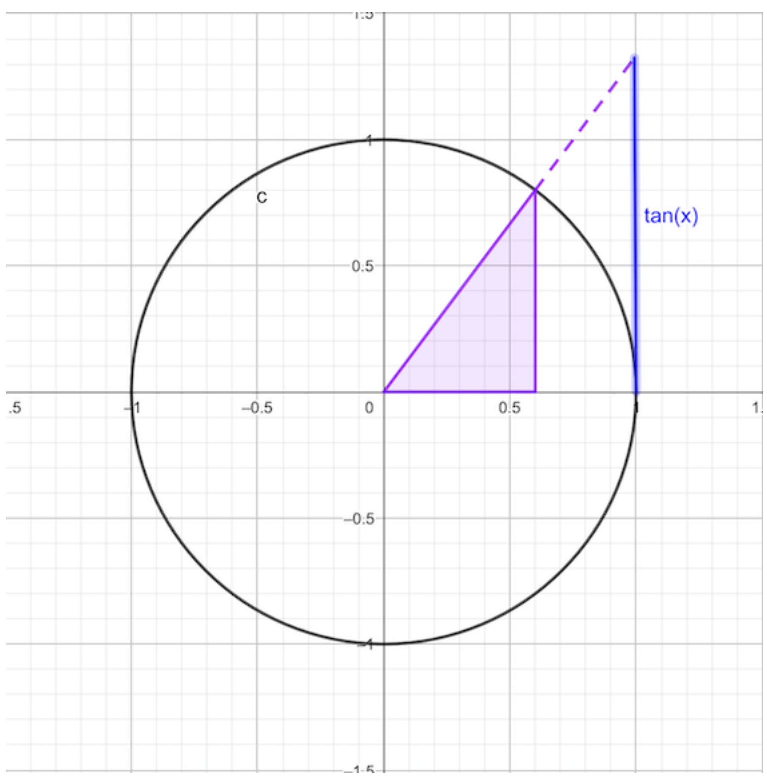


Figure 3: Representación gráfica de la $\tan(x)$

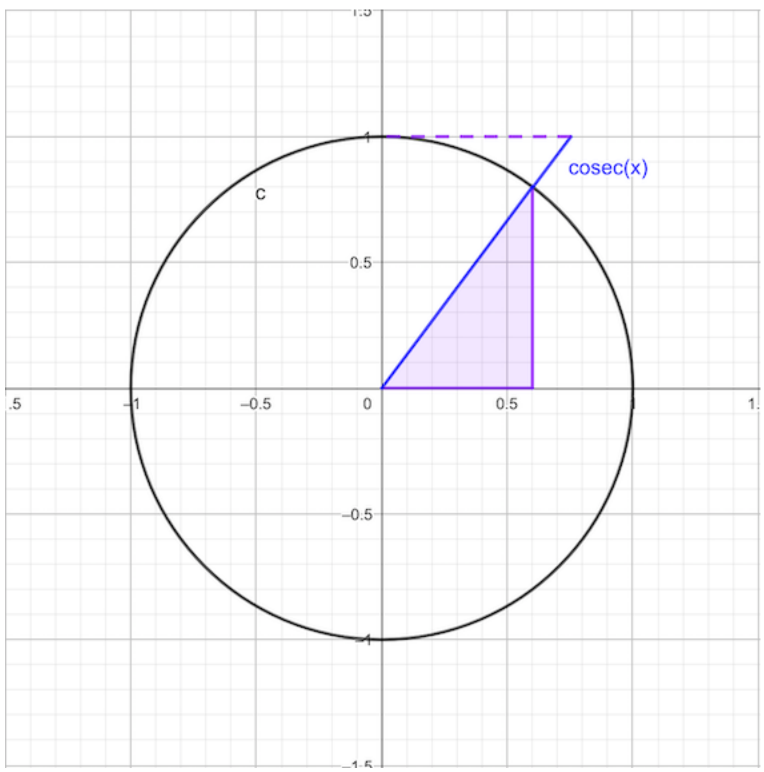


Figure 4: Representación gráfica de la $\csc(x)$

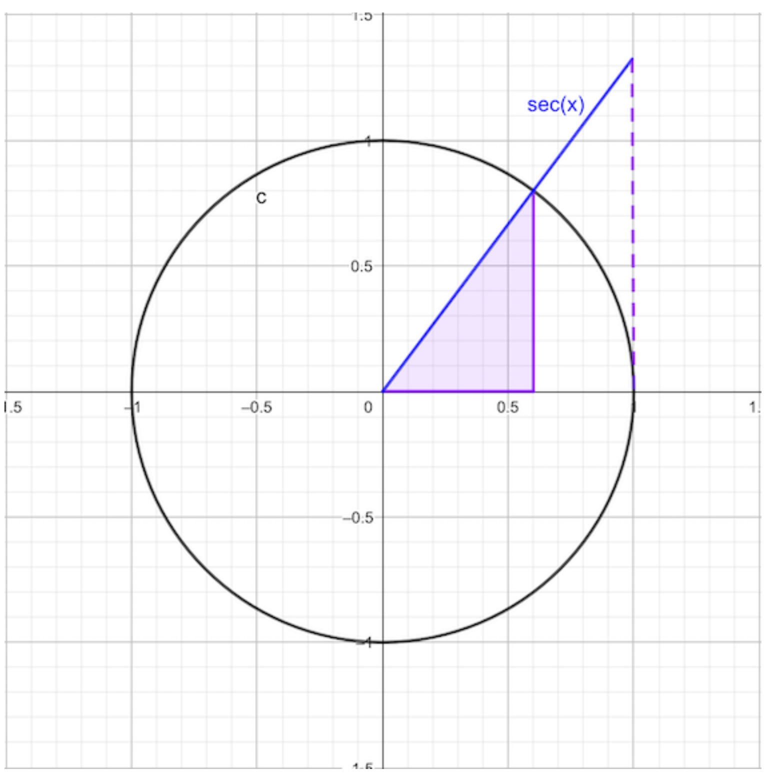


Figure 5: Representación gráfica de la $\sec(x)$

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

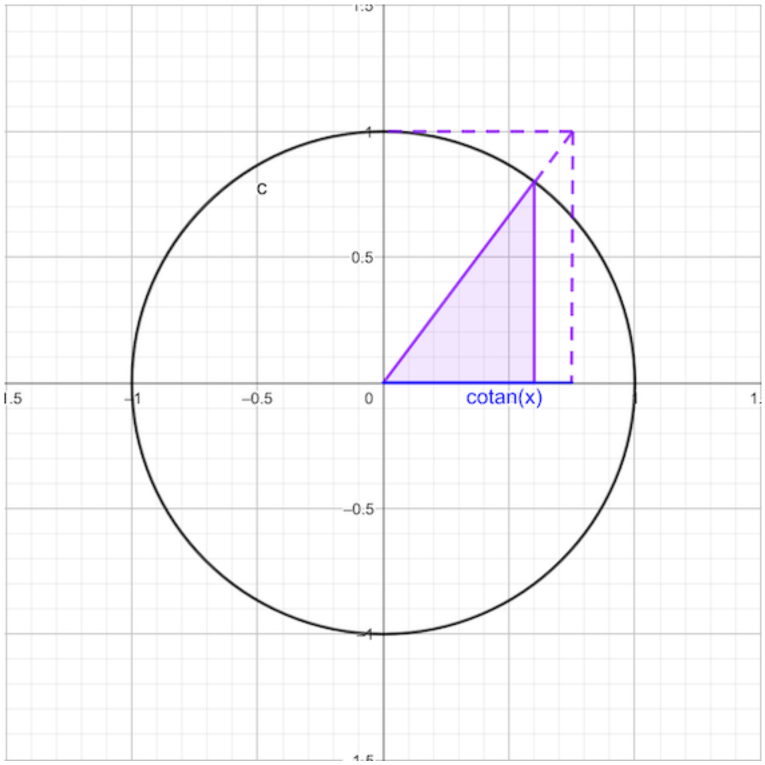


Figure 6: Representación gráfica de la $\cot(x)$

Relaciones fundamentales

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

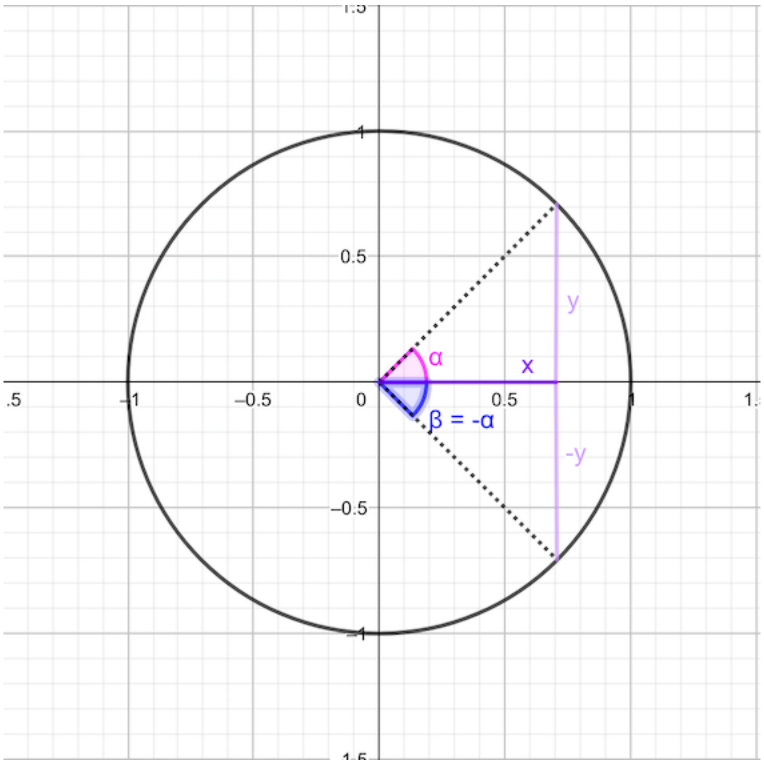
Relaciones pitagóricas

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

Relaciones entre las razones trigonométricas

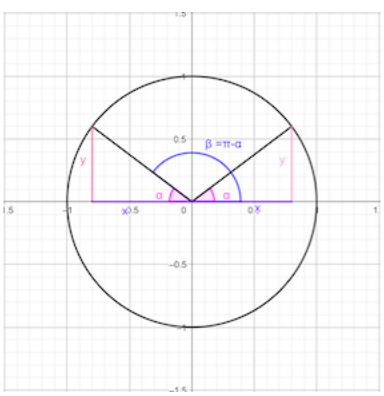
Ángulos opuestos

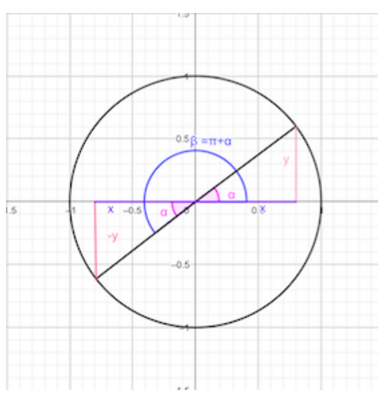
$$\sin(-\alpha) = -\sin(\alpha) \qquad \cos(-\alpha) = \cos(\alpha) \qquad \tan(-\alpha) = -\tan(\alpha)$$
$$\sin(2\pi - \alpha) = -\sin(\alpha) \qquad \cos(2\pi - \alpha) = \cos(\alpha) \qquad \tan(2\pi - \alpha) = -\tan(\alpha)$$



Ángulos suplementarios

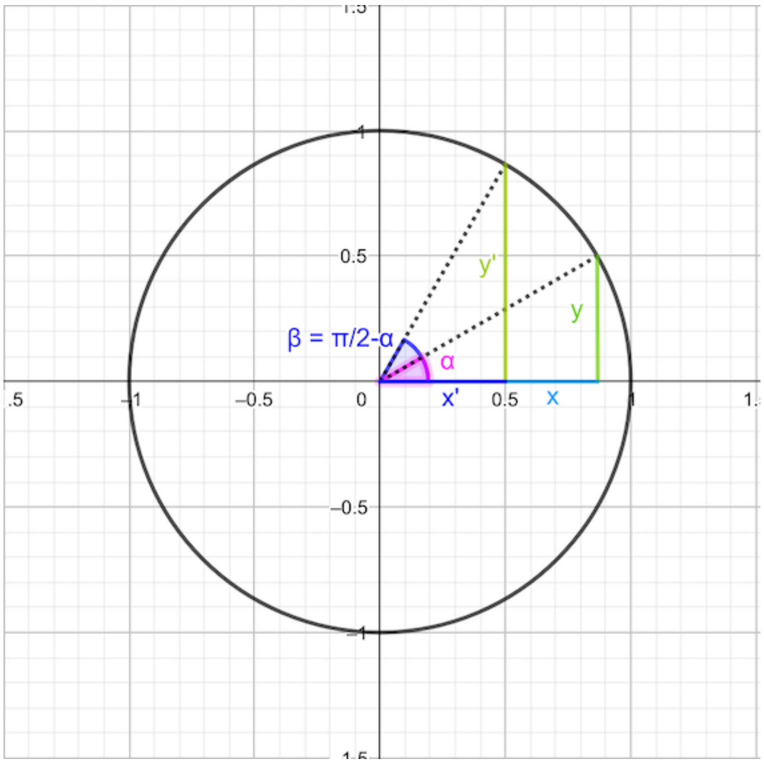
$$\sin(\pi \pm \alpha) = \mp \sin(\alpha)$$
$$\cos(\pi \pm \alpha) = -\cos(\alpha)$$
$$\tan(\pi \pm \alpha) = \mp \tan(\alpha)$$





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

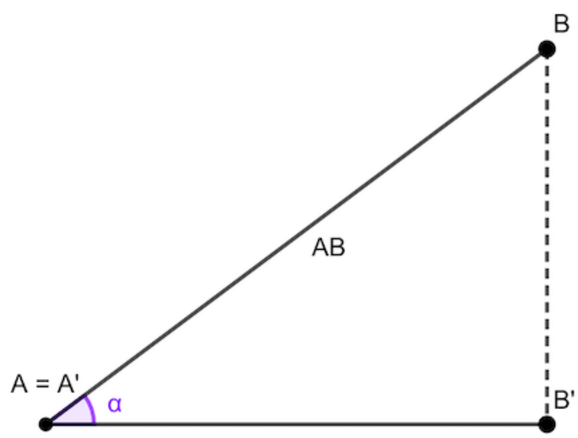
$$\sin(\alpha)+\sin(\beta)=2\sin\left(\frac{\alpha+\beta}{2}\right)\cos\left(\frac{\alpha-\beta}{2}\right) \qquad \sin(\alpha)-\sin(\beta)=2\cos\left(\frac{\alpha+\beta}{2}\right)\sin\left(\frac{\alpha-\beta}{2}\right)$$
$$\cos(\alpha)+\cos(\beta)=2\cos\left(\frac{\alpha+\beta}{2}\right)\cos\left(\frac{\alpha-\beta}{2}\right)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

Valores del seno, coseno y tangente usuales

Radianes	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
Grados	0ž	30ž	45ž	60ž	90ž
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	$\frac{3}{\sqrt{3}}$	∞

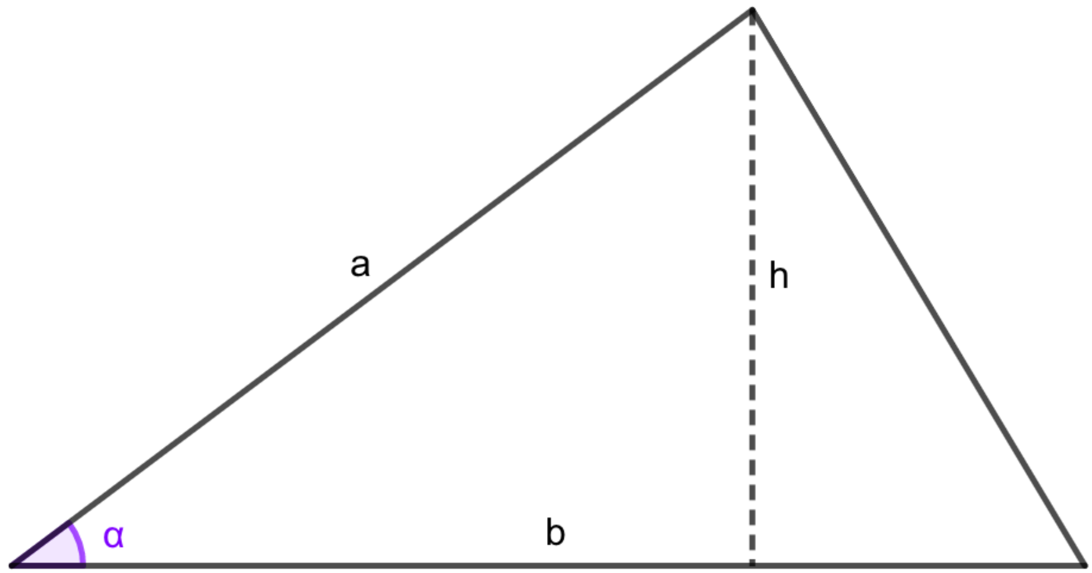
Proyección del segmento $\bar{AB}$ sobre una recta r

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



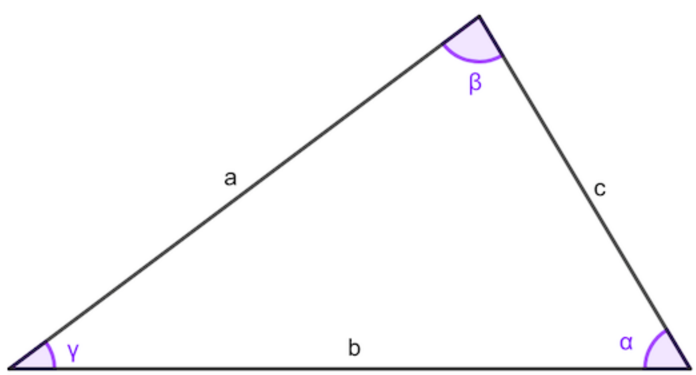
Área de un triángulo

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



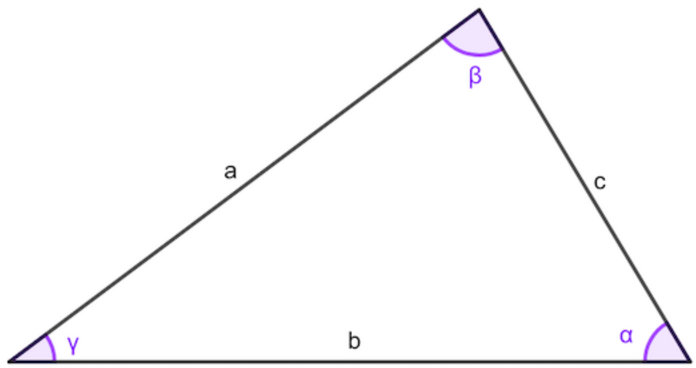
Teorema de los senos

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

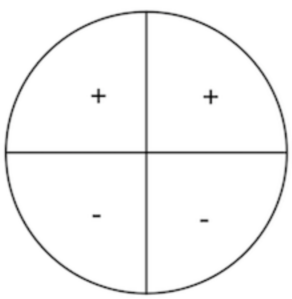


Teorema del coseno

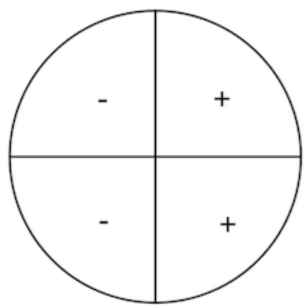
$$a^2 = b^2 + c^2 - 2bc\cos(\alpha)$$
$$b^2 = a^2 + c^2 - abc\cos(\beta)$$
$$c^2 = a^2 + b^2 - 2ab\cos(\gamma)$$



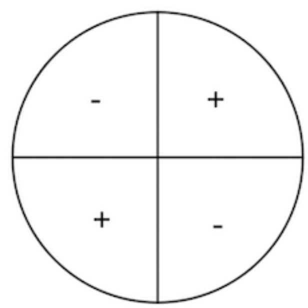
Más sobre seno, coseno y tangente



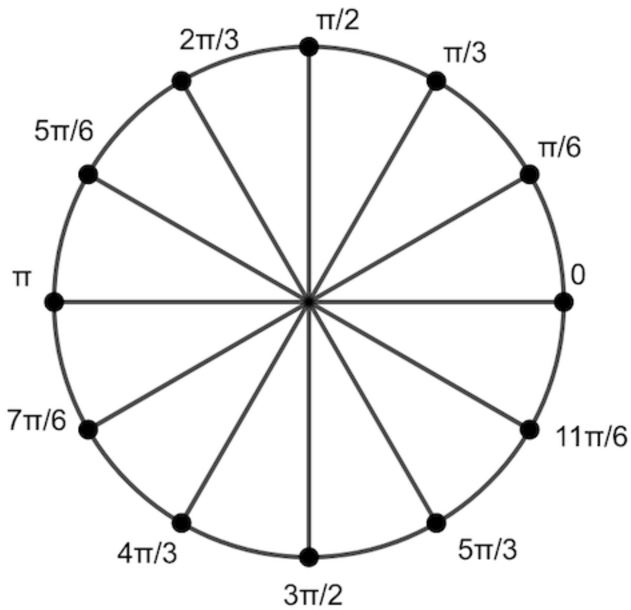
sin



cos



tan


π/2
2π/3
π/3
5π/6
π/6
π
0
7π/6
11π/6
4π/3
5π/3
3π/2