

## TRIÁNGULOS

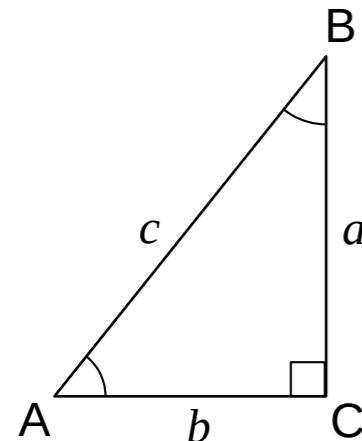
Los ángulos se denominan con la misma letra que los vértices.

A los lados se asigna la letra minúscula de su vértice opuesto.

La suma de los tres ángulos internos es  $180^\circ$ :  $A+B+C=180^\circ$

Cada lado es menor que la suma de los otros  
Cada lado es mayor que la resta de los otros

*Triángulo rectángulo*



**Teorema de Pitágoras**

$$a^2 + b^2 = c^2$$

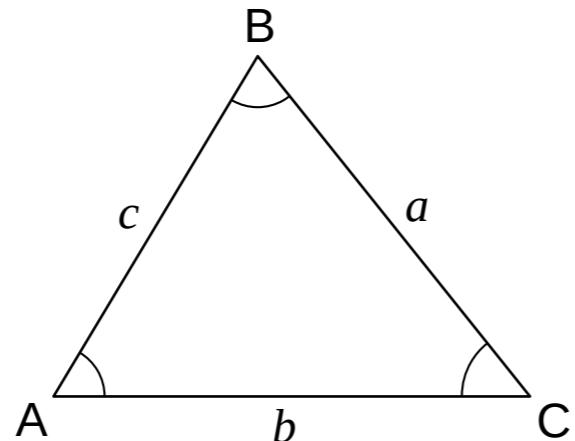
$$\sin A = \frac{a}{c} ; \quad \sin B = \frac{b}{c}$$

$$\cos A = \frac{b}{c} ; \quad \cos B = \frac{a}{c}$$

$$\tan A = \frac{a}{b} ; \quad \tan B = \frac{b}{a}$$

$$S = \frac{b \cdot a}{2} = \frac{\text{base} \cdot \text{altura}}{2}$$

*Triángulo oblicuángulo*



**Teorema del seno**

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

**Teorema del coseno**

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

**Área del triángulo**

$$S = \frac{1}{2} ab \sin C$$

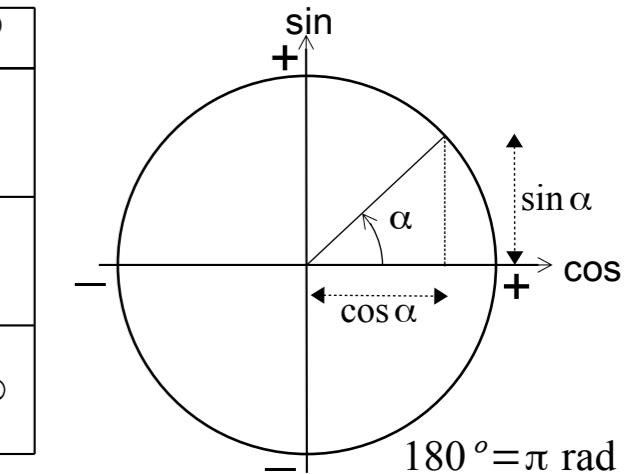
**Fórmula de Herón**

$$S = \sqrt{s(s-a)(s-b)(s-c)}$$

$s = (a+b+c)/2$  (semiperímetro)

## FÓRMULAS TRIGONOMÉTRICAS

	$0^\circ$	$30^\circ$	$45^\circ$	$60^\circ$	$90^\circ$
$\sin$	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	$\sqrt{3}$	$+\infty$



Fórmulas básicas

$$\sin^2 \alpha + \cos^2 \alpha = 1 ; \quad 1 + \tan^2 \alpha = \sec^2 \alpha$$

$$\tan \alpha = \frac{\sin \alpha}{\cos \alpha} ; \quad \cot \alpha = \frac{1}{\tan \alpha}$$

$$\sec \alpha = \frac{1}{\cos \alpha} ; \quad \csc \alpha = \frac{1}{\sin \alpha}$$

Razones de adición

$$\sin(a \pm b) = \sin a \cdot \cos b \pm \cos a \cdot \sin b$$

$$\cos(a \pm b) = \cos a \cdot \cos b \mp \sin a \cdot \sin b$$

$$\tan(a \pm b) = \frac{\tan a \pm \tan b}{1 \mp \tan a \cdot \tan b}$$

Razones del ángulo doble

$$\sin 2a = 2 \cdot \sin a \cdot \cos a$$

$$\cos 2a = \cos^2 a - \sin^2 a$$

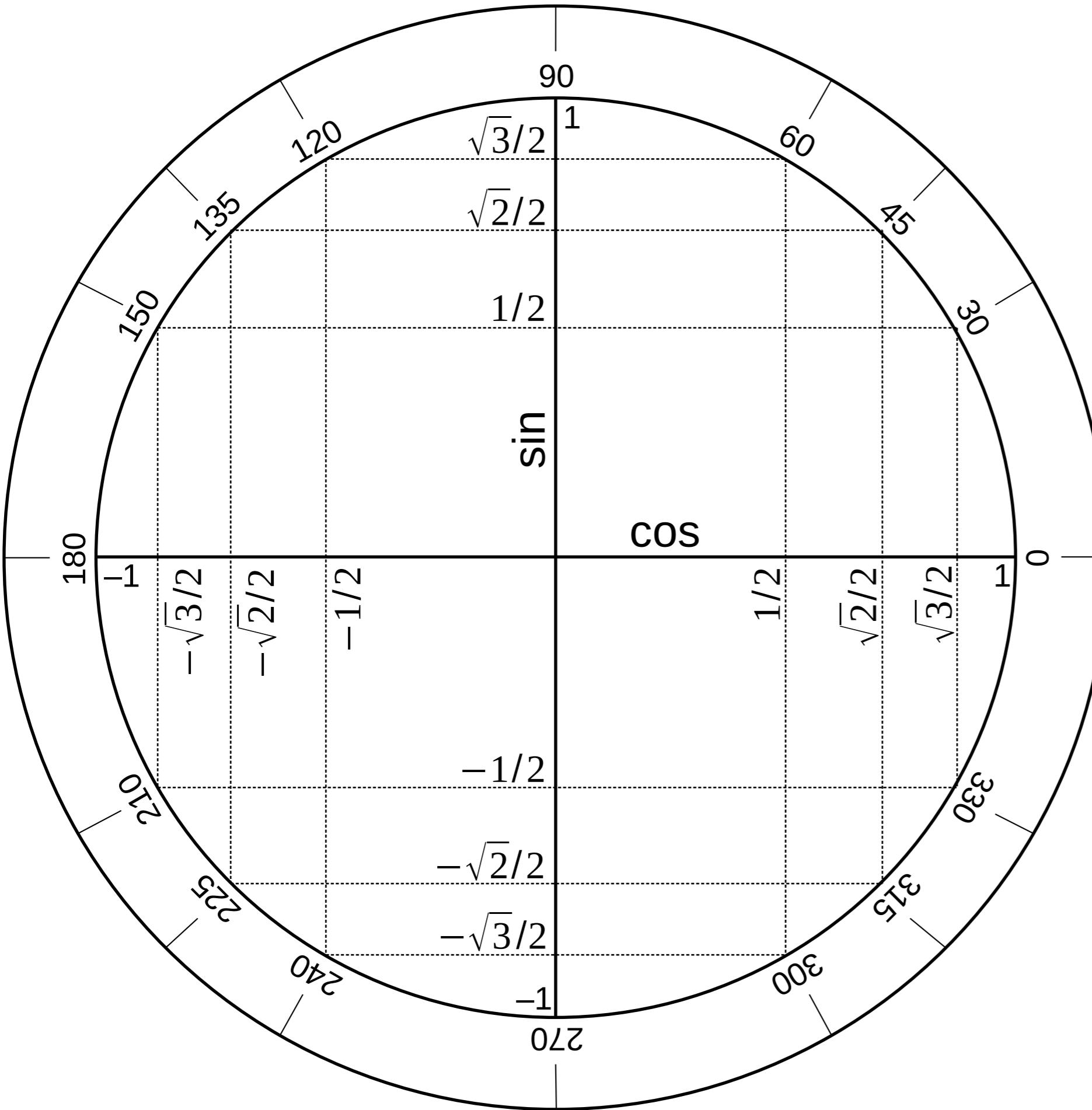
$$\tan 2a = \frac{2 \cdot \tan a}{1 - \tan^2 a}$$

Razones del ángulo mitad

$$\sin \frac{a}{2} = \pm \sqrt{\frac{1 - \cos a}{2}}$$

$$\cos \frac{a}{2} = \pm \sqrt{\frac{1 + \cos a}{2}}$$

$$\tan \frac{a}{2} = \pm \sqrt{\frac{1 - \cos a}{1 + \cos a}} = \frac{1 - \cos a}{\sin a}$$



1 vuelta =  $360^\circ = 2\pi$  radianes

1 radián es el ángulo para el que el arco = radio

Ángulo en radianes	Ángulo en grados	$\sin \alpha$	$\cos \alpha$	$\tan \alpha$
0	0	0	1	0
$\frac{\pi}{12}$	15	$\frac{\sqrt{6}-\sqrt{2}}{4}$	$\frac{\sqrt{6}+\sqrt{2}}{4}$	$2-\sqrt{3}$
$\frac{\pi}{10}$	18	$\frac{\sqrt{5}-1}{4}$	$\frac{\sqrt{10+2\sqrt{5}}}{4}$	$\frac{\sqrt{25-10\sqrt{5}}}{5}$
$\frac{\pi}{8}$	$22\frac{1}{2}$	$\frac{\sqrt{2}-\sqrt{2}}{2}$	$\frac{\sqrt{2}+\sqrt{2}}{2}$	$\sqrt{2}-1$
$\frac{\pi}{6}$	30	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
$\frac{\pi}{5}$	36	$\frac{\sqrt{10-2\sqrt{5}}}{4}$	$\frac{\sqrt{5}+1}{4}$	$\sqrt{5}-2\sqrt{5}$
$\frac{\pi}{4}$	45	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
$\frac{3\pi}{10}$	54	$\frac{\sqrt{5}+1}{4}$	$\frac{\sqrt{10-2\sqrt{5}}}{4}$	$\frac{\sqrt{25+10\sqrt{5}}}{5}$
$\frac{\pi}{3}$	60	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
$\frac{3\pi}{8}$	$67\frac{1}{2}$	$\frac{\sqrt{2}+\sqrt{2}}{2}$	$\frac{\sqrt{2}-\sqrt{2}}{2}$	$\sqrt{2}+1$
$\frac{2\pi}{5}$	72	$\frac{\sqrt{10+2\sqrt{5}}}{4}$	$\frac{\sqrt{5}-1}{4}$	$\sqrt{5+2\sqrt{5}}$
$\frac{5\pi}{12}$	75	$\frac{\sqrt{6}+\sqrt{2}}{4}$	$\frac{\sqrt{6}-\sqrt{2}}{4}$	$2+\sqrt{3}$
$\frac{\pi}{2}$	90	1	0	$+\infty$

$$\sin 180^\circ = 0 \quad \sin 270^\circ = -1$$

$$\cos 180^\circ = -1 \quad \cos 270^\circ = 0$$