

TRIGONOMETRÍA

Conversión de ángulos:

$$\text{radianes} = (\text{grados} \times 2\pi) / 360$$

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Tabla de valores trigonométricos:

Grados	0	30	45	60	90
Radianes	0	$\pi / 6$	$\pi / 4$	$\pi / 3$	$\pi / 2$
Senos	0	$1/2$	$\sqrt{2} / 2$	$\sqrt{3} / 2$	1
Cosenos	1	$\sqrt{3} / 2$	$\sqrt{2} / 2$	$1/2$	0
Tangente	0	$\sqrt{3} / 3$	1	$\sqrt{3}$	—

Relaciones trigonométricas:

Complementarios	$\sin(\pi/2 - x) = \cos x$	$\cos(\pi/2 - x) = \sin x$
Suplementarios	$\sin(\pi - x) = \sin x$	$\cos(\pi - x) = -\cos x$
Difieren en π	$\sin(\pi + x) = -\sin x$	$\cos(\pi + x) = -\cos x$
Difieren en $\pi/2$	$\sin(\pi/2 + x) = \cos x$	$\cos(\pi/2 + x) = -\sin x$
Opuestos	$\sin(-x) = -\sin x$	$\cos(-x) = \cos x$

Fórmulas trigonométricas:

1. Adición:

$$\begin{aligned} \sin(\alpha \pm \beta) &= \sin \alpha \cdot \cos \beta \pm \cos \alpha \cdot \sin \beta \\ \cos(\alpha \pm \beta) &= \cos \alpha \cdot \cos \beta \mp \sin \alpha \cdot \sin \beta \\ \tan(\alpha \pm \beta) &= (\tan \alpha \pm \tan \beta) / (1 \pm \tan \alpha \cdot \tan \beta) \end{aligned}$$

2. Ángulo doble:

$$\begin{aligned} \sin 2\alpha &= 2 \sin \alpha \cdot \cos \alpha \\ \cos 2\alpha &= \cos^2 \alpha - \sin^2 \alpha \\ \tan 2\alpha &= (2 \tan \alpha) / (1 - \tan^2 \alpha) \end{aligned}$$

3. Otros:

$$\begin{aligned} \cos(mx) \cdot \cos(nx) &= \frac{1}{2} [\cos(m+n)x + \cos(m-n)x] \\ \sin(mx) \cdot \sin(nx) &= \frac{1}{2} [\cos(m-n)x - \cos(m+n)x] \\ \sin(mx) \cdot \cos(nx) &= \frac{1}{2} [\sin(m+n)x + \sin(m-n)x] \end{aligned}$$

$$\begin{aligned} \sin^2 \alpha &= \frac{1}{2} (1 - \cos 2\alpha) \\ \cos^2 \alpha &= \frac{1}{2} (1 + \cos 2\alpha) \\ \sin^2 x + \cos^2 x &= 1 \end{aligned}$$

Funciones: cosec $x = 1 / \sin x$

sec $x = 1 / \cos x$

cotan $x = 1 / \tan x$

FUNCIONES HIPERBÓLICAS

1. Seno hiperbólico: $\sinh(x) = \frac{1}{2} (e^x - e^{-x})$
2. Coseno hiperbólico: $\cosh(x) = \frac{1}{2} (e^x + e^{-x})$
3. Tangente hiperbólica: $\tanh(x) = (e^x - e^{-x}) / (e^x + e^{-x})$
4. Argumento $\sinh(x)$: $\arg \sinh(x) = \ln |x + (x^2 + 1)^{1/2}|$
5. Argumento $\cosh(x)$: $\arg \cosh(x) = \ln |x + (x^2 - 1)^{1/2}|$
6. Argumento $\tanh(x)$: $\arg \tanh(x) = \frac{1}{2} \ln |(1+x)/(1-x)|$

SERIES

$$e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \dots = \sum_{n=0}^{\infty} \frac{x^n}{n!} \quad \forall x \in \mathbb{R}$$

$$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!} \quad \forall x \in \mathbb{R}$$

$$\cos x = x - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!} \quad \forall x \in \mathbb{R}$$

$$\ln(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \dots = \sum_{n=1}^{\infty} (-1)^{n+1} \frac{x^n}{n} \quad \forall x \in [-1, 1]$$

ÁREAS Y VOLÚMENES

1.- Rectángulo: $A = a \cdot b$

2.- Paralelogramo: $A = b \cdot h$

3.- Triángulo: $A = b \cdot h / 2$

4.- Círculo: $A = \pi r^2$ $L = 2 \pi r$

5.- Cono circular recto: $V = \frac{1}{3} \pi r^2 h$

6.- Cilindro: $A_{\text{lat}} = 2 \pi r h$ $V = \pi r^2 h$

7.- Esfera: $A = 4 \pi r^2$

$V = (4/3) \pi r^3$