

Fórmulas de álgebra

Exponentes

Si todas las bases son diferentes de cero:

$$u^m u^n = u^{m+n}$$

$$\frac{u^m}{u^n} = u^{m-n}$$

$$u^0 = 1$$

$$u^{-n} = \frac{1}{u^n}$$

$$(uv)^m = u^m v^m$$

$$(u^m)^n = u^{mn}$$

$$\left(\frac{u}{v}\right)^m = \frac{u^m}{v^m}$$

Radicales y exponentes racionales

Si todas las raíces son números reales:

$$\sqrt[n]{uv} = \sqrt[n]{u} \cdot \sqrt[n]{v}$$

$$\sqrt[n]{\frac{u}{v}} = \frac{\sqrt[n]{u}}{\sqrt[n]{v}} \quad (v \neq 0)$$

$$\sqrt[m]{\sqrt[n]{u}} = \sqrt[mn]{u}$$

$$(\sqrt[n]{u})^m = u^{\frac{m}{n}}$$

$$\sqrt[n]{u^m} = (\sqrt[n]{u})^m$$

$$\sqrt[n]{u^n} = \begin{cases} |u| & n \text{ par} \\ u & n \text{ impar} \end{cases}$$

$$u^{1/n} = \sqrt[n]{u}$$

$$u^{m/n} = (u^{1/n})^m = (\sqrt[n]{u})^m$$

$$u^{m/n} = (u^m)^{1/n} = \sqrt[n]{u^m}$$

Productos especiales

$$(u + v)(u - v) = u^2 - v^2$$

$$(u + v)^2 = u^2 + 2uv + v^2$$

$$(u - v)^2 = u^2 - 2uv + v^2$$

$$(u + v)^3 = u^3 + 3u^2v + 3uv^2 + v^3$$

$$(u - v)^3 = u^3 - 3u^2v + 3uv^2 - v^3$$

Factorización de polinomios

$$u^2 - v^2 = (u + v)(u - v)$$

$$u^2 + 2uv + v^2 = (u + v)^2$$

$$u^2 - 2uv + v^2 = (u - v)^2$$

$$u^3 + v^3 = (u + v)(u^2 - uv + v^2)$$

$$u^3 - v^3 = (u - v)(u^2 + uv + v^2)$$

Desigualdades

Si $u < v$ y $v < w$, entonces $u < w$.

Si $u < v$, entonces $u + w < v + w$.

Si $u < v$ y $c > 0$, entonces $uc < vc$.

Si $u < v$ y $c < 0$, entonces $uc > vc$.

Si $c > 0$, $|u| < c$ es equivalente a $-c < u < c$.

Si $c > 0$, $|u| > c$ es equivalente a $u < -c$ o bien $u > c$.

Fórmula cuadrática

Si $a \neq 0$, las soluciones de la ecuación $ax^2 + bx + c = 0$ están dadas por

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Logaritmos

Si $0 < b \neq 1$, $0 < a \neq 1$, $x, R, S, > 0$

$y = \log_b x$ si, y sólo si, $b^y = x$

$$\log_b 1 = 0$$

$$\log_b b = 1$$

$$\log_b b^y = y$$

$$b^{\log_b x} = x$$

$$\log_b RS = \log_b R + \log_b S$$

$$\log_b \frac{R}{S} = \log_b R - \log_b S$$

$$\log_b R^c = c \log_b R$$

$$\log_b x = \frac{\log_a x}{\log_a b}$$

Determinantes

$$\begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc$$

Sucesiones y series aritméticas

$$a_n = a_1 + (n - 1)d$$

$$S_n = n \left(\frac{a_1 + a_n}{2} \right) \text{ o } S_n = \frac{n}{2} [2a_1 + (n - 1)d]$$

Sucesiones y series geométricas

$$a_n = a_1 \cdot r^{n-1}$$

$$S_n = \frac{a_1(1 - r^n)}{1 - r} \quad (r \neq 1)$$

$$S = \frac{a_1}{1 - r} \quad (|r| < 1) \text{ serie geométrica infinita.}$$

Factorial

$$n! = n \cdot (n - 1) \cdot (n - 2) \cdot \dots \cdot 3 \cdot 2 \cdot 1$$

$$n \cdot (n - 1)! = n!, 0! = 1$$

Coficiente binomial

$$\binom{n}{r} = \frac{n!}{r!(n - r)!} \quad (\text{enteros } n \text{ y } r, n \geq r \geq 0)$$

Teorema del binomio

Si n es un entero positivo

$$(a + b)^n = \binom{n}{0} a^n + \binom{n}{1} a^{n-1} b$$

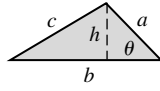
$$+ \dots + \binom{n}{r} a^{n-r} b^r + \dots + \binom{n}{n} b^n$$

Fórmulas de geometría

Triángulo

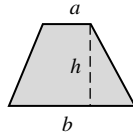
$$h = a \operatorname{sen} \theta$$

$$\text{Área} = \frac{1}{2}bh$$



Trapezio

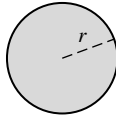
$$\text{Área} = \frac{h}{2}(a + b)$$



Círculo

$$\text{Área} = \pi r^2$$

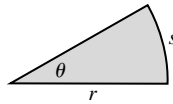
$$\text{Circunferencia} = 2\pi r$$



Sector circular

$$\text{Área} = \frac{\theta r^2}{2} \quad (\theta \text{ en radianes})$$

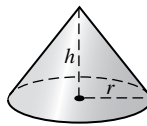
$$s = r\theta \quad (\theta \text{ en radianes})$$



Cono circular recto

$$\text{Volumen} = \frac{\pi r^2 h}{3}$$

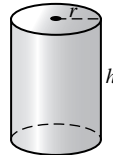
$$\text{Área de la superficie lateral} = \pi r \sqrt{r^2 + h^2}$$



Cilindro circular recto

$$\text{Volumen} = \pi r^2 h$$

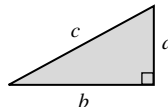
$$\text{Área de la superficie lateral} = 2\pi r h$$



Triángulo rectángulo

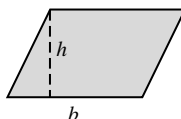
Teorema de Pitágoras:

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



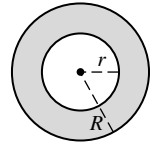
Paralelogramo

$$\text{Área} = bh$$



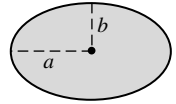
Anillo circular

$$\text{Área} = \pi(R^2 - r^2)$$



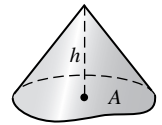
Elipse

$$\text{Área} = \pi ab$$



Cono

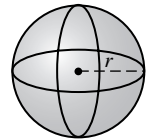
$$\text{Volumen} = \frac{Ah}{3} \quad (A = \text{Área de la base})$$



Esfera

$$\text{Volumen} = \frac{4}{3}\pi r^3$$

$$\text{Área de la superficie} = 4\pi r^2$$



Fórmulas de trigonometría

Medida angular

$$\pi \text{ radianes} = 180^\circ$$

$$\text{Por lo que } 1 \text{ radián} = \frac{180}{\pi} \text{ grados,}$$

$$\text{y } 1 \text{ grado} = \frac{\pi}{180} \text{ radianes.}$$

Identidades recíprocas

$$\operatorname{sen} x = \frac{1}{\operatorname{csc} x}$$

$$\operatorname{csc} x = \frac{1}{\operatorname{sen} x}$$

$$\operatorname{cos} x = \frac{1}{\operatorname{sec} x}$$

$$\operatorname{sec} x = \frac{1}{\operatorname{cos} x}$$

$$\operatorname{tan} x = \frac{1}{\operatorname{cot} x}$$

$$\operatorname{cot} x = \frac{1}{\operatorname{tan} x}$$

Identidades cociente

$$\operatorname{tan} x = \frac{\operatorname{sen} x}{\operatorname{cos} x}$$

$$\operatorname{cot} x = \frac{\operatorname{cos} x}{\operatorname{sen} x}$$

Identidades pitagóricas

$$\operatorname{sen}^2 x + \operatorname{cos}^2 x = 1$$

$$\operatorname{tan}^2 x + 1 = \operatorname{sec}^2 x$$

$$1 + \operatorname{cot}^2 x = \operatorname{csc}^2 x$$