ÁLGEBRA

Desigualdades

1. Si $a < b$ y $b < c$, entonces $a < c$
2. Si $a < b$, entonces $a + c < b + c$
3. Si $a < b$ y $c > 0$, entonces $ac < bc$
4. Si $a < b$ y $c < 0$, entonces $ac > bc$
5. Si $a < b$ y $c < d$, entonces $a + c < b + d$
6. Si $0 < a < b$ y $0 < c < d$, entonces $ac < bd$
7. Si $a < b$ y $ab > 0$, entonces $\dfrac{1}{a} > \dfrac{1}{b}$

Valor Absoluto

1. $|a| < \sqrt{a^2}$
2. $|ab| < |a| \cdot |b|$
3. $\left|\dfrac{a}{b}\right| < \dfrac{|a|}{|b|}$
4. $|x| < k \ (k > 0)$ si, y solo si, $-k < x < k$
5. $|x| > k \ (k \geq 0)$ si, y solo si, $x < -k$ o $x > k$

Exponentes

1. $b^m b^n = b^{m+n}$
2. $\dfrac{b^m}{b^n} = b^{m-n}$
3. $\left(b^m\right)^n = b^{mn}$
4. $(ab)^m = a^m b^m$
5. $\left(\dfrac{a}{b}\right)^m = \dfrac{a^m}{b^m}$
6. $b^{-n} = \dfrac{1}{b^n}$

Radicales

1. $b^{\frac{1}{n}} = \sqrt[n]{b}$
2. $b^{\frac{m}{n}} = \left(\sqrt[n]{b}\right)^m = \sqrt[n]{b^m}$
3. $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$
4. $\dfrac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\dfrac{a}{b}}$
5. $\sqrt[m]{\sqrt[n]{a}} = \sqrt[mn]{a}$
6. $b^{-n} = \dfrac{1}{b^n}$

Logaritmos

1. $\log_b N = x$ quiere decir $b^x = N$
2. $\log_b MN = \log_b M + \log_b N$
3. $\log_b \dfrac{M}{N} = \log_b M - \log_b N$
4. $\log_b \left(N\right)^k = k \log_b N$
5. $\log_b N = \dfrac{Ln\, N}{Ln\, b}$
6. $\log_b b^x = x$
7. $b^{\log_b x} = x$
8. $Ln\, x = \log_e x$, $\log x = \log_{10} x$

Fórmulas de factorización y multiplicación

1. $a^2 - b^2 = (a + b)(a - b)$
2. $a^3 - b^3 = (a - b)\left(a^2 + ab + b^2\right)$
3. $a^3 + b^3 = (a + b)\left(a^2 - ab + b^2\right)$
4. $a^2 + 2ab + b^2 = (a + b)^2$
5. $a^2 - 2ab + b^2 = (a - b)^2$
6. $a^3 + 3a^2b + 3ab^2 + b^3 = (a + b)^3$
7. $a^3 - 3a^2b + 3ab^2 - b^3 = (a - b)^3$

Fórmula cuadrática

La *ecuación cuadrática* $ax^2 + bx + c = 0$ tiene como soluciones: $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

TRIGONOMETRÍA

Identidades Fundamentales

1. $sen\,x\ csc\,x = 1$
2. $cos\,x\ sec\,x = 1$
3. $tan\,x\ cot\,x = 1$
4. $tan\,x = \dfrac{sen\,x}{cos\,x}$
5. $sen^2x + cos^2\,x = 1$
6. $1 + tan^2\,x = sec^2\,x$
7. $1 + cot^2\,x = csc^2\,x$
8. $cot\,x = \dfrac{cos\,x}{sen\,x}$

Productos de Senos y Cosenos

1. $sen\,A\ sen\,B = -\dfrac{1}{2}cos(A+B) + \dfrac{1}{2}cos(A-B)$
2. $sen\,A\ cos\,B = \dfrac{1}{2}sen(A+B) + \dfrac{1}{2}sen(A-B)$
3. $cos\,A\ sen\,B = \dfrac{1}{2}sen(A+B) - \dfrac{1}{2}sen(A-B)$
4. $cos\,A\ cos\,B = \dfrac{1}{2}cos(A+B) + \dfrac{1}{2}cos(A-B)$

Fórmulas para la suma

1. $sen(x+y) = sen\,x\ cos\,y + sen\,y\ cos\,x$
2. $cos(x+y) = cos\,x\ cos\,y - sen\,x\ sen\,y$
3. $tan(x+y) = \dfrac{tan\,x + tan\,y}{1 - tan\,x\ tan\,y}$

Fórmulas para la resta

1. $sen(x-y) = sen\,x\ cos\,y - sen\,y\ cos\,x$
2. $cos(x-y) = cos\,x\ cos\,y + sen\,x\ sen\,y$
3. $tan(x-y) = \dfrac{tan\,x - tan\,y}{1 + tan\,x\,tan\,y}$

Fórmulas para el doble de un ángulo

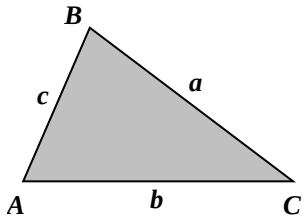
1. $sen\,2x = 2\,sen\,x\ cos\,x$
2. $cos\,2x = cos^2\,x - sen^2x$
   $= 1 - 2\,sen^2x$
   $= 2\,cos^2\,x - 1$
3. $tan\,2x = \dfrac{2\,tan\,x}{1 - tan^2\,x}$

Fórmulas para la mitad de un ángulo

1. $sen\dfrac{x}{2} = \pm\sqrt{\dfrac{1 - cos\,x}{2}}$
2. $cos\dfrac{x}{2} = \pm\sqrt{\dfrac{1 + cos\,x}{2}}$
3. $tan\dfrac{x}{2} = \dfrac{1 - cos\,x}{sen\,x} = \dfrac{sen\,x}{1 + cos\,x}$

Fórmulas para cuadrados

1. $sen^2x = \dfrac{1 - cos\,2x}{2}$
2. $cos^2\,x = \dfrac{1 + cos\,2x}{2}$
3. $tan^2\,x = \dfrac{1 - cos\,2x}{1 + cos\,2x}$



Ley de los cosenos

$a^2 = b^2 + c^2 - 2bc\,cos\,A$

$b^2 = a^2 + c^2 - 2ac\,cos\,B$

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

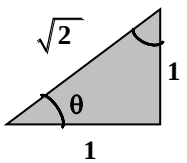
Ley de los senos

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

Funciones \ Cuadrante	I	II	III	IV
sen θ *y csc* θ	+	+	–	–
cos θ *y sec* θ	+	–	–	+
tan θ *y cot* θ	+	–	+	–

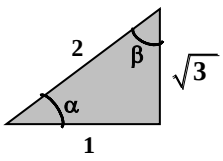
π *Radianes* = 180 *grados*

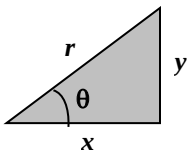
$\theta = 45^o = \dfrac{\pi}{4}$



$\alpha = 60^o = \dfrac{\pi}{3}$

$\beta = 30^o = \dfrac{\pi}{6}$





$$sen\,\theta = \frac{y}{r}\ ;\ csc\,\theta = \frac{r}{y}$$
$$cos\,\theta = \frac{x}{r}\ ;\ sec\,\theta = \frac{r}{x}$$
$$tan\,\theta = \frac{y}{x}\ ;\ cot\,\theta = \frac{x}{y}$$

$sen\,(-\theta) = -\,sen\,\theta$	$csc\,(-\theta) = -\,csc\,\theta$
$cos\,(-\theta) = +\,cos\,\theta$	$sec\,(-\theta) = +\,sec\,\theta$
$tan\,(-\theta) = -\,tan\,\theta$	$cot\,(-\theta) = -\,cot\,\theta$

Cuadrante	Angulo relacionado
I C	Directo
II C	Lo que falta para π (180º)
III C	Lo que se pasa de π (180º)
IV C	Lo que falta para 2π (360º)

Fórmulas de Integración

1. $\int (du + dv) = \int du + \int dv$
2. $\int a\,du = a\int du$
3. $\int dx = x + C$
4. $\int u^n du = \dfrac{u^{n+1}}{n+1},\ n \neq -1$
5. $\int \dfrac{du}{u} = Ln\,u + C$
6. $\int a^u du = \dfrac{a^u}{Ln\,a} + C$
7. $\int e^u du = e^u + C$
8. $\int sen\,u\,du = -\cos u + C$
9. $\int \cos u\,du = sen\,u + C$
10. $\int sec^2 u\,du = \tan u + C$
11. $\int csc^2 u\,du = -\cot u + C$
12. $\int sec\,u\tan u\,du = sec\,u + C$
13. $\int csc\,u\cot u\,du = -csc\,u + C$
14. $\int \tan u\,du = -Ln|\cos u| + C = Ln|sec\,u| + C$
15. $\int \cot u\,du = Ln|sen\,u| + C$
16. $\int sec\,u\,du = Ln|sec\,u + \tan u| + C$
17. $\int csc\,u\,du = Ln|csc\,u - \cot u| + C$
18. $\int \dfrac{du}{u^2 + a^2} = \dfrac{1}{a} arc\tan\dfrac{u}{a} + C$
19. $\int \dfrac{du}{u^2 - a^2} = \dfrac{1}{2a} Ln\left|\dfrac{u-a}{u+a}\right| + C;\ u^2 > a^2$
20. $\int \dfrac{du}{a^2 - u^2} = \dfrac{1}{2a} Ln\left|\dfrac{a+u}{a-u}\right| + C;\ a^2 > u^2$
21. $\int \dfrac{du}{\sqrt{a^2 - u^2}} = arc\,sen\dfrac{u}{a} + C$
22. $\int \dfrac{du}{\sqrt{u^2 \pm a^2}} = Ln\left|u + \sqrt{u^2 \pm a^2}\right| + C$
23. $\int \sqrt{a^2 - u^2}\,du = \dfrac{u}{2}\sqrt{a^2 - u^2} + \dfrac{a^2}{2} arc\,sen\dfrac{u}{a} + C$
24. $\int \sqrt{u^2 \pm a^2}\,du = \dfrac{u}{2}\sqrt{u^2 \pm a^2} \pm \dfrac{a^2}{2} Ln\left|u + \sqrt{u^2 \pm a^2}\right| + C$
25. $\int \dfrac{du}{u\sqrt{u^2 - a^2}} = \dfrac{1}{a} arc\,sec\dfrac{u}{a} + C$

Variaciones Trigonométricas

26. $\int sen^n u\cos u\,du = \dfrac{sen^{n+1} u}{n+1} + C$
27. $\int \cos^n u(-sen\,u)du = \dfrac{\cos^{n+1} u}{n+1} + C$
28. $\int \tan^n u\,sec^2 u\,du = \dfrac{\tan^{n+1} u}{n+1} + C$
29. $\int \cot^n u(-csc^2 u)\,du = \dfrac{\cot^{n+1} u}{n+1} + C$
30. $\int sec^n u\,sec\,u\tan u\,du = \dfrac{sec^{n+1} u}{n+1} + C$
31. $\int csc^n u(-csc\,u\cot u)\,du = \dfrac{csc^{n+1} u}{n+1} + C$

Sustitución Trigonométrica

$\sqrt{a^2 - u^2}$	hacer	$u = a\,sen\,\theta$
$\sqrt{a^2 + u^2}$	hacer	$u = a\tan\theta$
$\sqrt{u^2 - a^2}$	hacer	$u = a\,sec\,\theta$

Integración por Partes

$$\int u\,dv = uv - \int v\,du$$

Fórmulas de Diferenciación

1. $\frac{d}{dx}(c) = 0$
2. $\frac{d}{dx}(x) = 1$
3. $\frac{d}{dx}(u+v) = \frac{d}{dx}(u) + \frac{d}{dx}(v)$
4. $\frac{d}{dx}(cv) = c\frac{d}{dx}(v)$
5. $\frac{d}{dx}(uv) = u\frac{d}{dx}(v) + v\frac{d}{dx}(u)$
6. $\frac{d}{dx}(v^n) = nv^{n-1}\frac{d}{dx}(v)$
7. $\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{d}{dx}(u) - u\frac{d}{dx}(v)}{v^2}$
8. $\frac{d}{dx}(sen\,v) = cos\,v\frac{d}{dx}(v)$
9. $\frac{d}{dx}(cos\,v) = -sen\,v\frac{d}{dx}(v)$
10. $\frac{d}{dx}(tan\,v) = sec^2 v\frac{d}{dx}(v)$
11. $\frac{d}{dx}(cot\,v) = -csc^2 v\frac{d}{dx}(v)$
12. $\frac{d}{dx}(sec\,v) = sec\,v\,tan\,v\frac{d}{dx}(v)$
13. $\frac{d}{dx}(csc\,v) = -csc\,v\,cot\,v\frac{d}{dx}(v)$
14. $\frac{d}{dx}(arc\,sen\,v) = \frac{\frac{d}{dx}(v)}{\sqrt{1-v^2}}$
15. $\frac{d}{dx}(arc\,cos\,v) = \frac{-\frac{d}{dx}(v)}{\sqrt{1-v^2}}$
16. $\frac{d}{dx}(arc\,tan\,v) = \frac{\frac{d}{dx}(v)}{1+v^2}$
17. $\frac{d}{dx}(arc\,cot\,v) = \frac{-\frac{d}{dx}(v)}{1+v^2}$
18. $\frac{d}{dx}(arc\,sec\,v) = \frac{\frac{d}{dx}(v)}{v\sqrt{v^2-1}}$
19. $\frac{d}{dx}(arc\,csc\,v) = \frac{-\frac{d}{dx}(v)}{v\sqrt{v^2-1}}$
20. $\frac{d}{dx}(Log_a\,v) = \frac{\frac{d}{dx}(v)}{v}Log_a\,e$
21. $\frac{d}{dx}Ln\,v = \frac{\frac{d}{dx}(v)}{v}$
22. $\frac{d}{dx}(a^v) = a^v Ln\,a\frac{d}{dx}(v)$
23. $\frac{d}{dx}(e^v) = e^v\frac{d}{dx}(v)$
24. $\frac{d}{dx}(u^v) = vu^{v-1}\frac{d}{dx}(u) + u^v Ln\,u\frac{d}{dx}(v)$