FORMULARIO DE TRIGONOMETRIA

IDENTIDADES TRIGONOMETRICAS

RECIPROCAS	DE RELACION	PITAGORICAS
$\text{sen } A = \frac{1}{\csc A}$	$\tan A = \frac{\text{sen } A}{\cos A}$	$\text{sen}^2 A + \cos^2 A = 1$
$\cos A = \frac{1}{\sec A}$		$1 + \tan^2 A = \sec^2 A$
$\tan A = \frac{1}{\cot A}$	$\tan A = \frac{\cos A}{\text{sen } A}$	$1 + \cot^2 A = \csc^2 A$

FUNCIONES TRIGONOMETRICAS

DE LA SUMA Y DEFERENCIA DE ANGULOS

$\text{sen } (A \pm B = \text{sen } A \cos B \pm \cos A \text{ sen } B$

$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \pm \tan A \tan B}$

$\cos (A \pm B = \cos A \cos B \pm \text{sen } A \text{ sen } B$

$\cot(A \pm B) = \frac{\cot A \cot B \pm 1}{\cot B \pm \cot A}$

CONVERSION DE SUMA Y DIFERENCIA DE SENOS Y COSEÑON EN PRODUCTOS

$$\text{sen } A \pm \text{sen } B = 2 \text{ sen} \left(\frac{A \pm B}{2}\right) \cos\left(\frac{A \pm B}{2}\right)$$

$$\cos A \pm \cos B = 2 \cos \left(\frac{A + B}{2}\right) \cos\left(\frac{A - B}{2}\right)$$

$$\cos A \pm \cos B = 2 \text{ sen} \left(\frac{A + B}{2}\right) \text{sen}\left(\frac{A - B}{2}\right)$$

DUPLO DE UN ANGULO

$\text{sen } 2A = 2 \text{ sen } A \cos A$

$\cos 2A = \cos^2 A - \text{sen}^2 A$

$\cos 2A = 2 \cos^2 A - 1$

$\cos 2A = 1 - 2 \text{ sen}^2 A$

$\cos 2A = \frac{2 \tan A}{1 - \tan^2 A}$

MITAD DE UN ANGULO

$\text{sen } \left(\frac{A}{2}\right) = \sqrt{\frac{1 - \cos A}{2}}$

$\cos \left(\frac{A}{2}\right) = \sqrt{\frac{1 + \cos A}{2}}$

$\tan \left(\frac{A}{2}\right) = \sqrt{\frac{1 - \cos A}{1 + \cos A}}$

LEYES PARA TRIANGULOS OBLICUANGULOS

Ley de los senos: $\frac{a}{\text{sen } A} = \frac{b}{\text{sen } B} = \frac{c}{\text{sen } C}$

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 las tangentes:

$\frac{a + b}{a - b} = \frac{\tan 1/2 \, (A + B)}{\tan 1/2 \, (A - B)}$

FORMULARIO DE TRIGONOMETRIA Y ANALITICA $5.00

FORMULARIO DE GEOMETRIA ANALITICA

DISTANCIA ENTRE DOS PUNTOS $d = \sqrt{(x^2 - x1)^2 + (y^2 - y1)^2}$ $d = \sqrt{x^2 - y^2}$

PUNTO MEDIO DE UN SEGMENTO $x = \frac{x1 + x2}{2}$ $x = \frac{y1 + y2}{2}$

LA RECTA

ECUACION GENERAL $Ax + By + C = 0$ $m = \frac{A}{B}$ $b = \frac{C}{B}$

ECUACION SIMETRICA $\frac{x}{a} + \frac{y}{b} = 1$

EC. A PARTIR DE UN PUNTO Y UNA PENDIENTE $y - y1 = m(x - x1)$

EC. PENDIENTE - INTERSECCION $y = mx + b$ PENDIENTE $m = \frac{y2 - y1}{x2 - x1} = \tan \theta$

LA CIRCUNFERENCIA

CENTRO EN EL ORIGEN	CENTRO EN (h, k)
$r^2 = x^2 + y^2$	$r^2 = (x-h)^2 + (y-k)^2$
$x^2 + y^2 + Dx + Ey + F = 0$	$r = 1/2 \sqrt{D^2 + E - 4F}$

PARABOLA

EJE COINCIDENTE (PARALELO) A EJE X		EJE COINCIDENTE (PARALELO) A EJE X	
VERTICE ORIGEN	VERTICE (h, k)	VERTICE ORIGEN	VERTICE (h, k)
$y^2 = 4px$ $V = (0,0)$, $F = (p,0)$ Ec.Dir. $x = -p$	$(y-k)^2 = 4p\,(x-k)$ $V = (h-k)$, $F = (h+p,k)$ Ec. Dir. $x = h-p$	$x^2 = 4py$ $V = (0,0)$, $F = (0,p)$ Ec. Dir $y = -p$	$(x-k)^2 = 4p\,(y-k)$ $V = (h,k)$, $F = (h,k+p)$ Esc. Dir. $y = k-p$
$y^2 Dx - Ey + F = 0$		$x^2 - Dx - Ey + F = 0$	
Sí $p > 0$ abre a la derecha Sí $p < 0$ abre a la izquierda		Sí $p > 0$ abre hacia arriba Sí $p < 0$ abre hacia abajo	

Long. L, R, =(4p)

ELIPSE

EJE COINCIDENTE (PARALELO) A EJE X		EJE COINCIDENTE (PARALELO) A EJE X	
CENTRO ORIGEN	CENTRO (h,k)	CENTRO ORIGEN	CENTRO (h,k)
$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ $V = (\pm a, 0)$ $F = (\pm c, 0)$	$\frac{(x-y)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$ $V = (h \pm a, k)$ $F = (h \pm c, k)$	$\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$ $V = (0, \pm a)$ $F = (0, \pm c)$	$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$ $V = (h, k \pm a)$ $F = (h, k \pm c)$

$Ax^2 + Cy^2 + Dx + Ey + F = 0$ (A) (C)>0

Eje mayor =2a, Eje menor = 2b, L, R, = $2b^2 / a$, $e = c / a$, $a^2 = b^2 + c^2$, $a > b$

HIPERBOLA

EJE COINCIDENTE (PARALELO) A EJE X		EJE COINCIDENTE (PARALELO) A EJE X	
CENTRO ORIGEN	CENTRO (h,k)	CENTRO ORIGEN	CENTRO (h,k)
$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ $V = (\pm a, 0)$ $F = (\pm c, 0)$	$\frac{(x-y)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$ $V = (h \pm a, k)$ $F = (h \pm c, k)$	$\frac{x^2}{b^2} - \frac{y^2}{a^2} = 1$ $V = (0, \pm a)$ $F = (0, \pm c)$	$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$ $V = (h, k \pm a)$ $F = (h, k \pm c)$

$Ax^2 + Cy^2 + Dx + Ey + F = 0$ (A) (C)<0

Eje conjugado =2b, eje transverso =2b, L, R, = $2b^2/a$, $e = c/a$, $c^2 = a^2 + b^2$, $a^2 + b^2$

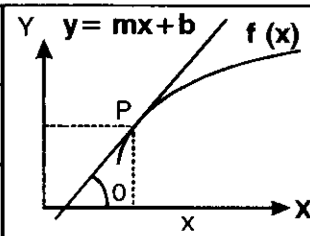
FORMULARIO DE DERIVADAS E INTEGRALES

TRIGONOMETRIA

h, 0, Ca

1	$\text{sen } 0 = \frac{Co}{h}$
2	$\text{sen } 0 = \frac{Ca}{h}$
3	$\text{sen } 0 = \frac{Co}{Ca}$
4	$\text{sen } 0 = \frac{1}{\tan 0}$
5	$\text{sen } 0 = \frac{1}{\cos ø}$
6	$\text{sen } 0 = \frac{1}{\text{sen } 0}$
7	$\text{sen } 0 = \frac{\text{sen } 0}{\cos 0}$
8	$\text{sen } 0 = \frac{\cos 0}{\text{sen } 0}$
9	$\cos^2 0 = 1 - \text{sen}^2 0$
10	$\tan^2 0 = \text{sen}^2\, 0 - 1$
11	$\text{ctg}^2 0 = \csc^2 0 - 1$
12	$\text{sen}^2 0 = \frac{1}{2}(1 - \cos 20)$
13	$\text{sen}^2 0 = \frac{1}{2}(1 + \cos 20)$
14	$\tan 20 = \frac{2 \tan 0}{1 - \tan^2 0}$
15	$\text{sen } 20 = 2 \text{ sen } 0 \cos 0 \quad \cos 20 = \cos^2 0 - \text{sen}^2 0$
17	$\text{sen } ax \text{ sen } bx = \frac{1}{2}[-\cos(a+b)x + \cos(a-b)x]$
18	$\cos ax \cos bx = \frac{1}{2}[\cos(a+b)x + \cos(a-b)x]$
19	$\text{sen } ax \cos bx = \frac{1}{2}[\text{sen}(a+b)x + \text{sen}(a-b)x]$

DERIVADAS



$y = f(x)$

$\frac{dy}{dx} \lim \frac{\Delta y}{\Delta x} = \tan 0 = m$

$f'(x) \lim_{\Delta x \to 0} f' \frac{(x + \Delta x) - f(x)}{\Delta x}$

PROPIEDADES

I	$(k) = 0$ (k-const)	7	$(\text{sen } v)' = \cos v \frac{dv}{dx}$
II	$[k f(x)]' = k f'(x)$	8	$(\cos v)' = -\text{senv} \frac{dv}{dx}$
III	$[f_1(x) \pm f_2(x)\ 1] f_1 \pm f_2$	9	$(\tan v)' = \sec^2 v \frac{dv}{dx}$
IV	$(uv)' = u' v + u v'$	10	$(\text{ctg } v)' = -\csc^2 v \frac{dv}{dx}$
V	$\left(\frac{1}{v}\right) = -\frac{1}{v^2} \frac{dv}{dx}$	11	$(\sec v)' = -\sec v \tan v \frac{dv}{dx}$
VI	$\left(\frac{u}{v}\right) = -\frac{u'v - uv'}{v^2}$	12	$(\csc v)' = -\csc v \text{ ctg } v \frac{dv}{dx}$
1	$(v^n)' = nv^{n-1} \frac{dv}{dx}$	13	$(\text{arc sen } v)' = \frac{1}{1 - v^2} \frac{dv}{dx}$
2	$(v)' = \frac{1}{2v} \frac{dv}{dx}$	14	$(\text{arc cos } v)' = \frac{1}{\sqrt{1 - v^2}} \frac{dv}{dx}$
3	$(v')' = a^v \ln a \frac{dv}{dx}$	15	$(\text{arc tan } v) = \frac{1}{1 - v^2} \frac{dv}{dx}$
4	$(v^v)' = e^v \frac{dv}{dx}$	16	$(\text{arc ctg } v)' = \frac{1}{1 - v^2} \frac{dv}{dx}$
5	$(\log_a v)' = \frac{1}{v} e \log_a e \frac{dv}{dx}$	17	$(\text{arc sec } v)' = \frac{1}{v\, v^2 - 1} \frac{dv}{dx}$
6	$(\ln v)' = \frac{1}{v} \frac{dv}{dx}$	18	$(\text{arc csc } v)' = \frac{1}{v\sqrt{v^2 - 1}} \frac{dv}{dx}$

INCREMENTO Y DIFERENCIAL

1	$y = f(x)$ $\Delta y = f(x + \Delta x) - f(x)$
2	$dy = f'(x)\, dx$ $z - f(x' y)$
3	$dx = \frac{\partial z}{\partial y} dx + \frac{\partial z}{\partial y} dy$

INTEGRALES

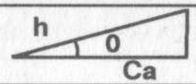
1	$\int dv \quad v + C$	2	$\int v^n dv = \frac{v^{n+1}}{n^{n+1}} + C \ (n = -1)$
3	$\int \frac{dv}{v} = \text{inv} + C$	4	$\int a^v dv = \frac{a^v}{\ln a} + C$
5	$\int e^v dv = e^v + C$	5'	$\int e^{kv} dv = \quad e^{kv} + C$
6	$\int \text{sen } v\, dv = -\cos v + C$	6	$\int \text{sen } kv\, dv = -\frac{1}{2} \cos v + C$
7	$\int \cos v\, dv = \text{sen } v + C$	7	$\int \cos kv\, dv = -\frac{1}{2} \text{sen } v + C$
8	$\int \tan v\, dv = -\ln \cos v + C$	9	$\int \text{sen } v \tan dv = \sec v + C$
10	$\int \text{ctg } v\, dv = -\ln \cos v + C$	11	$\int \csc v \text{ c tg } v\, dv = \csc v + C$
12	$\int \sec v\, dv = -\ln \sec v + \tan c + C$	13	$\int \sec^2 v\, dv = \tan v + C$
14	$\int \csc v\, dv = -\ln \csc v - \text{ctg } v + C$	15	$\int \csc^2 v\, dv = -\text{tg} + C$
16	$\int \frac{dv}{2^2 - v^2} = \frac{1}{2a} \ln \frac{a + v}{a - v} + C$	17	$\int \frac{dv}{a^2 - v^2} = \frac{1}{a} \arctan \frac{v}{v} + C$
18	$\int \frac{dv}{2^2 - v^2} = \text{arc sen } \frac{v}{a} + C$	19	$\int \frac{dv}{a^2 - v^2} = \ln v \quad \sqrt{v^2 + a^2} \pm C$
20	$\int a^2 - v^2\, dv = \frac{v}{a}\, a^2 - v^2 + \frac{a^2}{2} \text{arc sen } \frac{v}{a} + C$		INTEGRAL DEFINIDA $\int_b^a f(x)\, dx = F(b) - F(a)$
21	$\int v^2 \pm a^2\, dv = \frac{v}{a} v^2 \pm a^2 \pm \frac{a^2}{2} \ln + \sqrt{v^2 + a^2} \pm C$		

I	PROPIEDADES $\int kf(v)\, dv = K \int f(v)\, dv$	ANTIDERIVADA $F'(x) = f(x)$	$F(x) = \int f(x)\, dx$
II	$\int f(ax)\, dx = \frac{1}{a} \int f(v)\, dv$	III	$\int \left[f_1(v) \pm f_2(v)\right] dv = \int f_1(v) \pm \int_2 (v)\, dv$

CAMBIO DE VARIABLE		SUSTITUCION TRIGONOMETRICA	
I	$\int f(x)\, f\ (x)\, dx \quad \begin{cases} v = f(x) \text{ o parte} \\ dv = k f\ (x)\, dx \end{cases}$	I	$\int F\left(x \cdot \sqrt{a^2 - x^2}\right) dx \Rightarrow x = a \text{ sen } v$
II	$\int \frac{f_1(x)}{f_2(x)}\, dx \begin{cases} v = f_2(x) \text{ o parte} \\ dv = k f_1(x)\, dx \end{cases}$	II	$\int F\left(x \cdot \sqrt{a^2 + x^2}\right) dx \Rightarrow x = a \tan v$
I	POR PARTES $\int u\, dv = uv - \int v\, du$	III	$\int F\left(x \cdot \sqrt{a^2 - x^2}\right) dx \Rightarrow x = a \text{ sen } v$

FORMULARIO DE DERIVADAS E INTEGRALES

TRIGONOMETRIA



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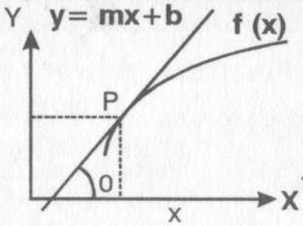

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I	$(k) = 0$ (k-const)
II	$[k\, f(x)]^1 = k\, f^1(x)$
III	$[f_1(x) \pm f_2(x)\ 1] f_1 \pm f_2$
IV	$(uv)^1 = u^1 v + u v^1$
V	$\left(\dfrac{1}{v}\right) = -\dfrac{1}{v^2}\dfrac{dv}{dx}$
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1	$(v^n)^1 = nv^{n-1}\dfrac{dv}{dx}$
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5	$(\log_a v)^1 = \dfrac{1}{v} e \log_a e \dfrac{dv}{dx}$
6	$(\ln v)^1 = \dfrac{1}{v}\dfrac{dv}{dx}$

7	$(\text{sen } v)^1 = \cos v \dfrac{dv}{dx}$
8	$(\cos v)^1 = -\text{sen} v \dfrac{dv}{dx}$
9	$(\tan v)^1 = \sec^2 v \dfrac{dv}{dx}$
10	$(\text{ctg } v)^1 = -\csc^2 v \dfrac{dv}{dx}$
11	$(\sec v)^1 = -\sec v \tan v \dfrac{dv}{dx}$
12	$(\csc v)^1 = -\csc v \text{ ctg } v \dfrac{dv}{dx}$
13	$(\text{arc sen } v)^1 = \dfrac{1}{1-v^2}\dfrac{dv}{dx}$
14	$(\text{arc cos } v)^1 = \dfrac{1}{\sqrt{1-v^2}}\dfrac{dv}{dx}$
15	$(\text{arc tan } v) = \dfrac{1}{1-v^2}\dfrac{dv}{dx}$
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INTEGRALES

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5	$\int e^v\, dv = e^v + C$	5'	$\int e^{kv} dv = \quad e^{kv} + C$
6	$\int \text{sen } v\, dv = -\cos v + C$	6	$\int \text{sen } kv\, dv = -\dfrac{1}{2}\cos v$
7	$\int \cos v\, dv = \text{sen } v + C$	7	$\int \cos kv\, dv = -\dfrac{1}{2}\text{sen } v$
8	$\int \tan v\, dv = -\ln \cos v + C$	9	$\int \text{sen } v \tan dv = \sec v$
10	$\int \text{ctg } v\, dv = -\ln \cos v + C$	11	$\int \csc v \text{ ctg } v\, dv = \csc v$
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16	$\int \dfrac{dv}{2^2 - v^2} = \dfrac{1}{2a}\ln\dfrac{a+v}{a-v} + C$	17	$\int \dfrac{dv}{a^2 - v^2} = \dfrac{1}{a}\arctan\dfrac{v}{v} +$
18	$\int \dfrac{dv}{2^2 - v^2} = \text{arc sen}\dfrac{v}{a} + C$	19	$\int \dfrac{dv}{a^2 - v^2} = \ln v \quad \sqrt{v^2 + a^2}$
20	$\int a^2 - v^2\, dv = \dfrac{v}{a}\, a^2 - v^2 + \dfrac{a^2}{2}\text{arc sen}\dfrac{v}{a} + C$		INTEGRAL D $\int_b^a f(x)\, dx = F$
21	$\int v^2 \pm a^2\, dv = \dfrac{v}{a} v^2 \pm a^2 \pm \dfrac{a^2}{2}\ln + \sqrt{v^2 + a^2} \pm C$		

PROPIEDADES

I	$\int kf(v)\, dv = K \int f(v)\, dv$	ANTIDERIVADA	$F^1(x) = f(x)$ $F(x) = \int f$
II	$\int f(ax)\, dx = \dfrac{1}{a}\int f(v)\, dv$	III	$\int \left[f_1(v) \pm f_2(v)\right] dv = \int f_1(v$

CAMBIO DE VARIABLE

I	$\int f(x)\, f\ (x)\, dx \quad \begin{cases} v = f(x) \text{ o parte} \\ dv = k\, f\ (x)\, dx \end{cases}$
II	$\int \dfrac{f_1(x)}{f_2(x)}\, dx \quad \begin{cases} v = f_2(x) \text{ o parte} \\ dv = k\, f_1(x)\, dx \end{cases}$

POR PARTES

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

SUSTITUCION TRIGONOM

I	$\int F\left(x, \sqrt{a^2 - x^2}\right) dx \Rightarrow x =$
II	$\int F\left(x, \sqrt{a^2 + x^2}\right) dx \Rightarrow x$
III	$\int F\left(x, \sqrt{a^2 - x^2}\right) dx \Rightarrow x =$