Derivadas

1) $\frac{d}{dx}(u+v) = u' + v'$

2) $\frac{d}{dx}(k\,u) = k\,u'$

3) $\frac{d}{dx}(u\,v) = u\,v' + v\,u'$

4) $\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\,u' - u\,v'}{v^2}$

5) $\frac{d}{dx}(u(v)) = u'(v)\,v'$

6) $\frac{d}{dx}(c) = 0$

7) $\frac{d}{dx}(x) = 1$

8) $\frac{d}{dx}(v^n) = nv^{n-1}\,v'$

9) $\frac{d}{dx}(e^v) = e^v\,v'$

10) $\frac{d}{dx}(a^v) = lna\,a^v\,v'$

11) $\frac{d}{dx}(cosv) = -senv\,v'$

12) $\frac{d}{dx}(senv) = cosv\,v'$

13) $\frac{d}{dx}(tgv) = sec^2v\,v'$

14) $\frac{d}{dx}(ctgv) = -csc^2v\,v'$

15) $\frac{d}{dx}(secv) = secv\,tgv\,v'$

16) $\frac{d}{dx}(cscv) = -cscv\,ctgv\,v'$

17) $\frac{d}{dx}(arcsenv) = \frac{v'}{\sqrt{1-v^2}}$

18) $\frac{d}{dx}(arccosv) = -\frac{v'}{\sqrt{1-v^2}}$

19) $\frac{d}{dx}(arctanv) = \frac{v'}{v^2+1}$

20) $\frac{d}{dx}(arccotv) = -\frac{v'}{v^2+1}$

21) $\frac{d}{dx}(arcsecv) = \frac{v'}{v\sqrt{v^2-1}}$

22) $\frac{d}{dx}(arccscv) = -\frac{v'}{v\sqrt{v^2-1}}$

23) $\frac{d}{dx}(lnv) = \frac{v'}{v}$

24) $\frac{d}{dx}(log_B v) = \frac{v'}{lnB\,v}$

Integrales

1) $\int(f(x) \pm g(x))dx = \int f(x)dx \pm \int g(x)dx$

2) $\int k\,f(x)dx = k\int f(x)dx$

3) $\int dx = x + c$

4) $\int k\,dx = kx + c$

5) $\int x^n dx = \frac{x^{n+1}}{n+1} + c$

6) $\int e^v dv = e^v + c$

7) $\int a^v dv = \frac{a^v}{ln\,a} + c$

8) $\int v^n dv = \frac{v^{n+1}}{n+1} + c$

9) $\int v^{-1} dv = \int \frac{dv}{v} = ln|v| + c$

10) $\int \frac{dv}{v^2+a^2} = \begin{cases} \frac{1}{a}arctan\frac{v}{a} + c \\ -\frac{1}{a}arcot\frac{v}{a} + c \end{cases}$

11) $\int \frac{dv}{\sqrt{a^2-v^2}} = \begin{cases} arcsen\frac{v}{a} + c \\ -arcos\frac{v}{a} + c \end{cases}$

12) $\int \frac{dv}{v\sqrt{v^2-a^2}} = \begin{cases} \frac{1}{a}arcsec\frac{v}{a} + c \\ -\frac{1}{a}arccsc\frac{v}{a} + c \end{cases}$

13) $\int Senv\,dv = -Cosv + c$

14) $\int Cosv\,dv = Senv + c$

15) $\int Sec^2v\,dv = Tgv + c$

16) $\int Csc^2v\,dv = -Ctgv + c$

17) $\int Secv\,Tgv\,dv = Secv + c$

18) $\int Cscv\,Ctgv\,dv = -Cscv + c$

19) $\int Tgv\,dv = \begin{cases} -ln|Cosv| + c \\ ln|Secv| + c \end{cases}$

20) $\int Ctgv\,dv = \begin{cases} ln|Senv| + c \\ -ln|Cscv| + c \end{cases}$

21) $\int Secv\,dv = \begin{cases} ln|Secv + Tgv| + c \\ -ln|Secv - Tgv| + c \end{cases}$

22) $\int Cscv\,dv = \begin{cases} -ln|Cscv + Ctgv| + c \\ ln|Cscv - Ctgv| + c \end{cases}$

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

Series

1) $\sum_{i=1}^{n}(f(i) \pm g(i)) =$
$\sum_{i=1}^{n} f(i) \pm \sum_{i=1}^{n} g(i)$

2) $\sum_{i=1}^{n} k\,f(i) = k\sum_{i=1}^{n} f(i)$

3) $\sum_{i=1}^{n} i^k = n^k + \sum_{i=1}^{n}(i-1)^k$

4) $\sum_{i=1}^{n} k = kn$

5) $\sum_{i=1}^{n} i = \frac{1}{2}n(1+n)$

6) $\sum_{i=1}^{n} i^2 = \frac{1}{6}n(1+n)(1+2n)$

7) $\sum_{i=1}^{n} i^3 = \frac{1}{4}n^2(1+n)^2$

8) $\sum_{i=1}^{n} a^i = \frac{a(a^n-1)}{a-1}$

9) $\sum_{i=1}^{n} a^{-i} = \frac{a^{-n}(a^n-1)}{a-1}$

10) $\sum_{i=1}^{\infty} a^i = \frac{a}{1-a} \quad 0 < a < 1$

11) $\sum_{i=1}^{\infty} a^{-i} = \frac{1}{a-1} \quad a > 1$

Serie de Taylor

12) $\boldsymbol{f(x)} = f(a) + \sum_{n=1}^{\infty} f^n(a)\frac{(x-a)^n}{n!}$

Serie de Maclaurin

13) $\boldsymbol{f(x)} = f(0) + \sum_{n=1}^{\infty} f^n(0)\frac{(x)^n}{n!}$

14) $\boldsymbol{f(x)} = f(0) + f'(0)x + f''(0)\frac{x^2}{2!} +$
$f'''(0)\frac{x^3}{3!} + \cdots$

Identidades Trigonométricas

Definición de las seis funciones trigonométricas

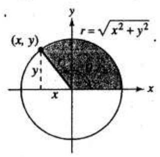
Definiciones por triángulos rectángulos, donde $0 < \theta < \pi/2$.

$\operatorname{sen}\theta = \frac{op}{hip}$ $\quad \csc\theta = \frac{hip}{op}$

$\cos\theta = \frac{ady}{hip}$ $\quad \sec\theta = \frac{hip}{ady}$

$\tan\theta = \frac{op}{ady}$ $\quad \cot\theta = \frac{ady}{op}$

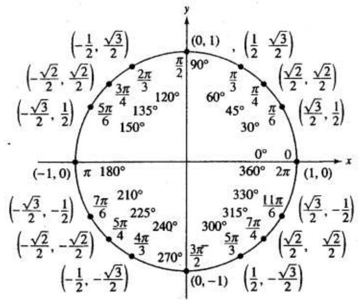
Definiciones como funciones, donde θ es cualquier ángulo.



$\operatorname{sen}\theta = \frac{y}{r}$ $\quad \csc\theta = \frac{r}{y}$

$\cos\theta = \frac{x}{r}$ $\quad \sec\theta = \frac{r}{x}$

$\tan\theta = \frac{y}{x}$ $\quad \cot\theta = \frac{x}{y}$



Identidades recíprocas

$\operatorname{sen} x = \frac{1}{\csc x}$ $\quad \sec x = \frac{1}{\cos x}$ $\quad \tan x = \frac{1}{\cot x}$

$\csc x = \frac{1}{\operatorname{sen} x}$ $\quad \cos x = \frac{1}{\sec x}$ $\quad \cot x = \frac{1}{\tan x}$

Identidades de tangente y cotangente

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

Identidades pitagóricas

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

$1 + \tan^2 x = \sec^2 x \qquad 1 + \cot^2 x = \csc^2 x$

Identidades de cofunciones

$\operatorname{sen}\left(\frac{\pi}{2} - x\right) = \cos x \qquad \cos\left(\frac{\pi}{2} - x\right) = \operatorname{sen} x$

$\csc\left(\frac{\pi}{2} - x\right) = \sec x \qquad \tan\left(\frac{\pi}{2} - x\right) = \cot x$

$\sec\left(\frac{\pi}{2} - x\right) = \csc x \qquad \cot\left(\frac{\pi}{2} - x\right) = \tan x$

Fórmulas de reducción

$\operatorname{sen}(-x) = -\operatorname{sen} x \qquad \cos(-x) = \cos x$

$\csc(-x) = -\csc x \qquad \tan(-x) = -\tan x$

$\sec(-x) = \sec x \qquad \cot(-x) = -\cot x$

Fórmulas de suma y diferencia

$\operatorname{sen}(u \pm v) = \operatorname{sen} u \cos v \pm \cos u \operatorname{sen} v$

$\cos(u \pm v) = \cos u \cos v \mp \operatorname{sen} u \operatorname{sen} v$

$\tan(u \pm v) = \frac{\tan u \pm \tan v}{1 \mp \tan u \tan v}$

Fórmulas del ángulo doble

$\operatorname{sen} 2u = 2 \operatorname{sen} u \cos u$

$\cos 2u = \cos^2 u - \operatorname{sen}^2 u = 2\cos^2 u - 1 = 1 - 2\operatorname{sen}^2 u$

$\tan 2u = \frac{2\tan u}{1 - \tan^2 u}$

Fórmulas de reducción de potencias

$\operatorname{sen}^2 u = \frac{1 - \cos 2u}{2}$

$\cos^2 u = \frac{1 + \cos 2u}{2}$

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

Fórmulas de suma-producto

$\operatorname{sen} u + \operatorname{sen} v = 2\operatorname{sen}\left(\frac{u+v}{2}\right)\cos\left(\frac{u-v}{2}\right)$

$\operatorname{sen} u - \operatorname{sen} v = 2\cos\left(\frac{u+v}{2}\right)\operatorname{sen}\left(\frac{u-v}{2}\right)$

$\cos u + \cos v = 2\cos\left(\frac{u+v}{2}\right)\cos\left(\frac{u-v}{2}\right)$

$\cos u - \cos v = -2\operatorname{sen}\left(\frac{u+v}{2}\right)\operatorname{sen}\left(\frac{u-v}{2}\right)$

Fórmulas de producto-suma

$\operatorname{sen} u \operatorname{sen} v = \frac{1}{2}[\cos(u - v) - \cos(u + v)]$

$\cos u \cos v = \frac{1}{2}[\cos(u - v) + \cos(u + v)]$

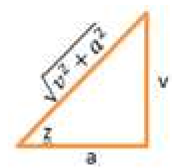
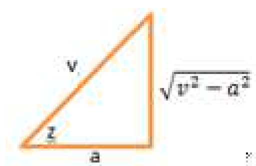
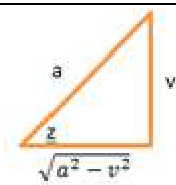
$\operatorname{sen} u \cos v = \frac{1}{2}[\operatorname{sen}(u + v) + \operatorname{sen}(u - v)]$

$\cos u \operatorname{sen} v = \frac{1}{2}[\operatorname{sen}(u + v) - \operatorname{sen}(u - v)]$

Potencias trigonométricas

Caso	Debe quedar	Se debe separar
Sen^{impar}	$Cosv$	$-Senv\,dv$
Cos^{impar}	$Senv$	$Cosv\,dv$
Sec^{par}	$Tanv$	$Sec^2v\,dv$
Csc^{par}	$Cotv$	$-Csc^2v\,dv$
Tan^{impar}	$Secv$	$Secv\,Tanv\,dv$
Cot^{impar}	$Cscv$	$-Cscv\,Cotv\,dv$
Sen^{Par} y/o Cos^{Par} Utilizar identidad reducción de potencias.		
Tg^{Par} cambiar todo a $Secv$ o separar Tg^2v y cambiarlo a $Secv$		
Sec^{Impar} y $Sec^{Impar}Tg^{Par}$ Cambiar todo a $Secv$ y utilizar integración por partes cíclica.		

Sustitución trigonométrica

		
$Tanz = \frac{v}{a}$ $\quad Secz = \frac{\sqrt{v^2+a^2}}{a}$	$Secz = \frac{v}{a}$ $\quad Tanz = \frac{\sqrt{v^2-a^2}}{a}$	$Senz = \frac{v}{a}$ $\quad Cosz = \frac{\sqrt{a^2-v^2}}{a}$

Aplicaciones geométricas

1) $A = \int_a^b f(x)dx$

2) $A = -\int_a^b g(x)dx$

3) $A = \int_a^b [f(x) - g(x)]dx$

4) $V = \pi\int_a^b [f(x)]^2 dx$

5) $L = \int_a^b \sqrt{1 + [f'(x)]^2}dx$

6) $\bar{x} = \frac{1}{A}\int_a^b x[f(x) - g(x)]dx$

7) $\bar{y} = \frac{1}{2A}\int_a^b \left[\left(f(x)\right)^2 - (g(x))^2\right]dx$

8) $vp = \frac{1}{b-a}\int_a^b f(x)dx$