REGLAS DE DERIVACIÓN **Gilberto Paredes**

Algebra de derivadas	Derivadas Notables
Suma y resta: $[f(x) \pm g(x)]' = f'(x) \pm g'(x)$ *Producto*: $[f(x).g(x)]' = f'(x)g(x) + f(x)g'(x)$ *Cociente*: $\left[\frac{f(x)}{g(x)}\right]' = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$ *Constante por una función*: $[cf(x)]' = cf'(x)$	*Derivada de una constante* $[c]' = 0$ *Derivada de una variable respecto a ella misma* $[x]' = 1$

Tipo de Función	Función Simple	Función Compuesta
Potencia	$[x^n]' = nx^{n-1}\ n \in \mathbb{Q}$	$[u^n]' = nu^{n-1}u'\ n \in \mathbb{Q}$
Radical	$\left[\sqrt[n]{x}\right]' = \frac{1}{n\sqrt[n]{x^{n-1}}}\ n \in \mathbb{N}, n \geq 2$	$\left[\sqrt[n]{n}\right]' = \frac{1}{n\sqrt[n]{u^{n-1}}}u'\ n \in \mathbb{N}, n \geq 2$
Valor absoluto	$[\lvert x\rvert]' = \frac{x}{\lvert x\rvert}\ x \neq 0$	$[\lvert u\rvert]' = \frac{u}{\lvert u\rvert}u'\ u \neq 0$
Logaritmo de base e	$[lnx]' = \frac{1}{x}\quad x > 0$	$[lnu]' = \frac{1}{u}\ u > 0$
Logaritmo de base a	$[\log_a x]' = \frac{1}{(lna)x}\quad x > 0\ , a > 0$	$[\log_a u]' = \frac{1}{(lna)u}u'\ x > 0\ , a > 0$
Exponencial de base e	$[e^x]' = e^x$	$[e^u]' = e^u u'$
Exponencial de base a	$[a^x]' = a^x lna\quad a > 0$	$[a^u]' = ln(a)a^u u'\quad a > 0$
Trigonométricas	$[\sin x]' = \cos x$	$[\sin u]' = (\cos u)u'$
	$[\cos x]' = -\sin x$	$[\cos u]' = -(\sin u)u'$
	$[\tan x]' = sec^2 x$	$[\tan u]' = (sec^2 u)u'$
	$[\cot x]' = -csc^2 x$	$[\cot u]' = -(csc^2 u)u'$
	$[\sec x]' = \sec x \tan x$	$[\sec u]' = (\sec u \tan u)u'$
	$[\csc x]' = -\csc x \cot x$	$[\csc u]' = -(\csc u \cot u)u'$
Trigonométricas inversas	$[\sin^{-1} x]' = \frac{1}{\sqrt{1 - x^2}}$	$[\sin^{-1} u]' = \frac{1}{\sqrt{1 - u^2}}u'$
	$[\cos^{-1} x]' = -\frac{1}{\sqrt{1 - x^2}}$	$[\cos^{-1} u]' = -\frac{1}{\sqrt{1 - u^2}}u'$
	$\tan^{-1} x = \frac{1}{1 + x^2}$	$\tan^{-1} u = \frac{1}{1 + u^2}u'$
	$\cot^{-1} x = -\frac{1}{1 + x^2}$	$\cot^{-1} u = -\frac{1}{1 + u^2}u'$
	$\sec^{-1} x = \frac{1}{\lvert x\rvert\sqrt{x^2 - 1}}$	$\sec^{-1} u = \frac{1}{\lvert u\rvert\sqrt{u^2 - 1}}u'$
	$\csc^{-1} x = -\frac{1}{\lvert x\rvert\sqrt{x^2 - 1}}$	$\csc^{-1} u = -\frac{1}{\lvert u\rvert\sqrt{u^2 - 1}}u'$
Trigonométricas Hiperbólicas	$[\sinh x]' = \cosh x$	$[\sinh u]' = \cosh u$
	$[\cosh x]' = \sinh x$	$[\cosh u]' = \sinh u$
	$[\tanh x]' = \text{sech}^2 x$	$[\tanh u]' = \text{sech}^2 u$
	$[\coth x]' = -\text{csch}^2 x$	$[\coth u]' = -\text{csch}^2 u$
	$[\text{sech}\, x]' = -\text{sech}\, x \tanh x$	$[\text{sech}\, u]' = -\text{sech}\, u \tanh u$
	$[\text{csch}\, x]' = -\text{csch}\, x \coth x$	$[\text{csch}\, u]' = -\text{csch}\, u \coth u$

Algebra de integrales	Integrales Notables
Suma y resta: $\int [f(x) + g(x)]dx = \int f(x)dx \pm \int g(x)dx$ *Constante por una integral*: $\int c[f(x)]dx = c\int f(x)dx$ Función: $\int f(ax)dx = \frac{1}{a}\int f(u)du$ *Integración por partes*: $\int udv = uv - \int vdu$ *Función compuesta*: $\int F[f(x)dx] = \int F(u)\frac{dx}{du}du = \int \frac{F(u)}{f(x)}du \;\; u = f(x)$	*Integral* $\int dx = x + C$ *Integral de* $\int kdx = kx + C$

Tipo de Función	Función Simple	Función Compuesta
Potencia	$\int x^n dx = \frac{x^{n+1}}{n+1} + C$	$\int x^n dx = \frac{x^{n+1}}{n+1} + C$
Reciproca	$\int \frac{1}{x}dx = \ln x \quad x > 0$	$\int \frac{1}{x}dx = \ln x \quad x > 0$
Exponencial de base e	$\int e^x = e^x + C$	$\int e^x = e^x + C$
Exponencial de base a	$\int a^x dx = \int e^{x\ln a}dx = \frac{e^{x\ln x}}{\ln a} = \frac{a^x}{\ln a}$	$\int a^x dx = \frac{e^{x\ln x}}{\ln a} = \frac{a^x}{\ln a}$
	$\int \sin x\, dx = -\cos x + c$	$\int \sin u\, du = -\cos u + c$
	$\int \cos x\, dx = \sin x + C$	$\int \cos u\, du = \sin u + C$
	$\int \tan x\, dx = \ln\sec x = -\ln\cos x$	$\int \tan u\, du = \ln\sec u = -\ln\cos u$
	$\int \cot x\, dx = \ln\sin x$	$\int \cot u\, du = \ln\sin u$
	$\int \sec x\, dx = \ln(\sec x + \tan x)$	$\int \sec u\, du = \ln(\sec u + \tan u)$
	$\int \csc x\, dx = \ln(\csc x - \cot x)$	$\int \csc u\, du = \ln(\csc u - \cot u)$
	$\int \sec x \tan x\, dx = \sec x$	$\int \sec u \tan u\, du = u$
	$\int \csc x \cot x\, dx = -\csc x$	$\int \csc u \cot u\, du = -\csc u$
	$\int sec^2 xdx = \tan x$	$\int sec^2 udu = \tan u$
Trigonométricas	$\int csc^2 xdx = -\cot x$	$\int csc^2 udu = -\cot u$
	$\int tan^2 xd\,x = \tan x - x$	$\int tan^2 ud\,u = u$
	$\int cot^2 x\, dx = -\cot x - x$	$\int cot^2 u\, du = -\cot u - u$
	$\int \frac{dx}{x^2 + a^2} = \frac{1}{a}\tan^{-1}\frac{x}{a}$	$\int \frac{du}{u^2 + a^2} = \frac{1}{a}\tan^{-1}\frac{u}{a}$
	$\int \frac{dx}{x^2 - a^2}d = \frac{1}{2a}\ln\left(\frac{x-a}{x+a}\right)$	$\int \frac{du}{u^2 - a^2} = \frac{1}{2a}\ln\left(\frac{u-a}{u+a}\right)$
	$\int \frac{dx}{\sqrt{x^2 \pm a^2}} = \ln\left\|x + \sqrt{x^2 \pm a^2}\right\|$	$\int \frac{du}{\sqrt{u^2 \pm a^2}} = \ln\left\|u + \sqrt{u^2 \pm a^2}\right\|$
	$\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1}\frac{x}{a}$	$\int \frac{du}{\sqrt{u^2 \pm a^2}} = \sin^{-1}\frac{u}{a}$
	$\int \frac{dx}{\sqrt{x^2 \pm a^2}} = ln\left\|x + \sqrt{x^2 \pm a^2}\right\|$	$\int \frac{du}{\sqrt{u^2 \pm x^2}} = ln\left\|u + \sqrt{u^2 \pm a^2}\right\|$