

Potencias

- $m^a m^b = m^{a+b}$
- $\frac{m^a}{m^b} = m^{a-b}$
- $m^0 = 1$
- $(m^n)^p = m^{np}$

Logaritmos

- $\log_b N = x \Leftrightarrow b^x = N$
- $\log_b b = 1 \quad (b^1 = b)$
- $\log_b 1 = 0 \quad (b^0 = 1)$
- $\log_b 0 \rightarrow -\infty$
- $\log_b(NM) = \log_b N + \log_b M$
- $\log_b(N/M) = \log_b N - \log_b M$
- $\log_b N^p = p \log_b N \Leftrightarrow \log_b \sqrt[p]{N} = \frac{1}{p} \log_b N$
- $\ln = \log_e$

Ejemplo: $\log \left(\frac{3^4 \cdot \sqrt[3]{15}}{128 \cdot 5^{40}} \right) = 4 \log 3 + \frac{1}{3} \log 15 - \log 128 - 40 \log 5$

Cambios de base

$$\left. \begin{array}{l} \ln N = x \quad \leftrightarrow \quad e^x = N \\ \log_{10} N = y \quad \leftrightarrow \quad 10^y = N \end{array} \right\} e^x = 10^y$$

$$x \log_{10} e = [\log_{10} e^x = \log_{10} 10^y] = y \log_{10} 10 = y$$

$$\left. \begin{array}{l} \ln N = \frac{\log_{10} N}{\log_{10} e} \\ \log_{10} N = \frac{\ln N}{\ln 10} \end{array} \right\} \log_b N = \frac{\log_a N}{\log_a b}$$

Tema 5. Derivadas de funciones elementales

función	derivada	función compuesta	derivada
Constante $f(x) = k$	0		
Identidad $f(x) = x$	1		
Potencia x^n	nx^{n-1}	$f(x)^n$	$nf(x)^{n-1}f'(x)$
Raíz n-ésima $\sqrt[n]{x^m}$	$\frac{m}{n}\sqrt[n]{x^{m-n}}$	$\sqrt[n]{f(x)^m}$	$f'(x)\frac{m}{n}\sqrt[n]{f(x)^{m-n}}$
Inversa $\frac{1}{x^n}$	$\frac{-n}{x^{n+1}}$	$\frac{1}{f(x)^n}$	$\frac{-nf'(x)}{f(x)^{n+1}}$
Exponencial a^x e^x	$\ln(a)a^x$ e^x	$a^{f(x)}$ $e^{f(x)}$	$a^{f(x)}\ln(a)f'(x)$ $f'(x)e^{f(x)}$
Logaritmo $\ln x$ $\log_a(x)$	$\frac{1}{x}$ $\frac{1}{x \ln a}$	$\ln(f(x))$ $\log_a(f(x))$	$\frac{f'(x)}{f(x)}$ $\frac{f'(x)}{f(x) \ln(a)}$
Seno $\text{sen}(x)$ $\text{arc sen}(x)$ $\text{senh}(x)$ $\text{arcsenh}(x)$	$\cos(x)$ $\frac{1}{\sqrt{1-x^2}}$ $\cosh(x)$ $\frac{1}{\sqrt{x^2+1}}$	$\text{sen}(f(x))$ $\text{arc sen}(f(x))$	$\cos(f(x))f'(x)$ $\frac{f'(x)}{\sqrt{1-f(x)^2}}$
Coseno $\cos(x)$ $\text{arc cos}(x)$ $\cosh(x)$ $\text{arccosh}(x)$	$-\text{sen}(x)$ $\frac{-1}{\sqrt{1-x^2}}$ $\sinh(x)$ $\frac{1}{\sqrt{x^2-1}}$	$\cos(f(x))$ $\text{arc cos}(f(x))$	$-\text{sen}(f(x))f'(x)$ $\frac{-f'(x)}{\sqrt{1-f(x)^2}}$
Tangente $\text{tg}(x)$ $\text{arc tg}(x)$ $\tanh(x)$ $\text{arctanh}(x)$	$\sec^2(x) = 1 + \text{tg}^2(x)$ $\frac{1}{1+x^2}$ $\frac{1}{\cosh^2(x)}$ $\frac{1}{1-x^2}$	$\text{tg}(f(x))$ $\text{arc tg}(f(x))$	$\frac{f'(x)}{\cos^2 f(x)}$ $\frac{f'(x)}{1+f(x)^2}$

Tema 6. Integrales inmediatas

función	integral	función compuesta	integral
$\int x^n dx$	$\frac{x^{n+1}}{n+1} + K$ si $n \neq -1$	$\int f'(x)f(x)^n dx$	$\frac{f(x)^{n+1}}{n+1} + K$ si $n \neq -1$
$\int \frac{dx}{\sqrt{x}}$	$2\sqrt{x} + K$	$\int \frac{f'(x)}{\sqrt{f(x)}} dx$	$2\sqrt{f(x)} + K$
$\int \frac{1}{x} dx$	$\ln x + K$	$\int \frac{f'(x)}{f(x)} dx$	$\ln f(x) + K$
$\int a^x dx$	$\frac{a^x}{\ln a} + K$	$\int a^{f(x)} f'(x) dx$	$\frac{a^{f(x)}}{\ln a} + K$
$\int \cos(x) dx$	$\sin(x) + K$	$\int f'(x) \cos(f(x)) dx$	$\sin(f(x)) + K$
$\int \sin(x) dx$	$-\cos(x) + K$	$\int f'(x) \sin(f(x)) dx$	$-\cos(f(x)) + K$
$\int \frac{dx}{\cos^2(x)}$	$\operatorname{tg}(x) + K$	$\int \frac{f'(x)}{\cos^2(x)} dx$	$\operatorname{tg}(f(x)) + K$
$\int \frac{dx}{\sin^2(x)}$	$-\cotg(x) + K$	$\int \frac{f'(x)}{\sin^2(x)} dx$	$-\cotg(f(x)) + K$
$\int \frac{dx}{\sqrt{1-x^2}}$	$\arcsen(x) + K$	$\int \frac{f'(x)}{\sqrt{1-f(x)^2}} dx$	$\arcsen(f(x)) + K$
$\int \frac{dx}{1+x^2}$	$\arctg(x) + K$	$\int \frac{f'(x)}{1+f(x)^2} dx$	$\arctg(f(x)) + K$
$\int \sinh(x) dx$	$\cosh(x) + K$	$\int f'(x) \sinh(f(x)) dx$	$\cosh(f(x)) + K$
$\int \cosh(x) dx$	$\sinh(x) + K$	$\int f'(x) \cosh f(x) dx$	$\sinh(f(x)) + K$
$\int \frac{dx}{\cosh^2(x)}$	$\operatorname{tgh}(x) + K$	$\int \frac{f'(x)}{\cosh^2(f(x))} dx$	$\operatorname{tgh}(f(x)) + K$
$\int \frac{dx}{\sinh^2(x)}$	$-\operatorname{cotgh}(x) + K$	$\int \frac{f'(x)}{\sinh^2(f(x))} dx$	$-\operatorname{cotgh}(f(x)) + K$
$\int \frac{\cosh(x)}{\sinh^2(x)} dx$	$-\operatorname{cosech}(x) + K$	$\int \frac{f'(x) \cosh(f(x))}{\sinh^2(f(x))} dx$	$-\operatorname{cosech}(f(x)) + K$
$\int \frac{\sinh(x)}{\cosh^2(x)} dx$	$-\operatorname{sech}(x) + K$	$\int \frac{f'(x) \sinh(f(x))}{\cosh^2(f(x))} dx$	$-\operatorname{sech}(f(x)) + K$