Límites Especiales

$$\lim_{x\to 0}\frac{\operatorname{sen} x}{x}=1 \qquad \lim_{x\to\infty}\left(1+\frac{1}{x}\right)^{x}=e$$

$$\lim_{x\to 0}\frac{x}{\operatorname{sen} x}=1 \qquad \lim_{x\to\infty}\left(1+\frac{k}{x}\right)^{x}=e^{k}$$

$$\lim_{x\to 0}\frac{a^{x}-1}{x}=\ln(a) \qquad \lim_{x\to 0}(1+x)^{\frac{1}{x}}=e$$

Reglas de Derivación

$$y=f(x)\,g(x) \Rightarrow y'=f'(x)g(x)+f(x)g'(x)$$

$$y=\frac{f(x)}{g(x)} \Rightarrow y'=\frac{f'(x)g(x)-f(x)g'(x)}{g^{2}(x)}$$

$$h(x)=f(g(x)) \Rightarrow h'(x)=f'(g(x))\cdot g'(x)$$

Derivadas

$f(x)=x^{n} \Rightarrow f'(x)=n\,x^{n-1}$

$f(x)=k \Rightarrow f'(x)=0$

$f(x)=x \Rightarrow f'(x)=1$

$f(x)=ax+b \Rightarrow f'(x)=a$

$f(x)=\sqrt{x} \Rightarrow f'(x)=\dfrac{1}{2\sqrt{x}}$

$f(x)=e^{x} \Rightarrow f'(x)=e^{x}$

$f(x)=a^{x} \Rightarrow f'(x)=a^{x}\ln a$

$f(x)=\ln x \Rightarrow f'(x)=\dfrac{1}{x}$

$f(x)=\log_{a}x \Rightarrow f'(x)=\dfrac{1}{x\ln a}$

$f(x)=\operatorname{sen}(x) \Rightarrow f'(x)=\cos(x)$

$f(x)=\cos(x) \Rightarrow f'(x)=-\operatorname{sen}(x)$

$f(x)=\tan(x) \Rightarrow f'(x)=\sec^{2}(x)$

$f(x)=\cot(x) \Rightarrow f'(x)=-\csc^{2}(x)$

$f(x)=\sec(x) \Rightarrow f'(x)=\sec(x)\cdot\tan(x)$

$f(x)=\csc(x) \Rightarrow f'(x)=-\csc(x)\cdot\cot(x)$

$f(x)=\arctan(x) \Rightarrow f'(x)=\dfrac{1}{1+x^{2}}$

$f(x)=\arcsin(x) \Rightarrow f'(x)=\dfrac{1}{\sqrt{1-x^{2}}}$

$f(x)=\arccos(x) \Rightarrow f'(x)=-\dfrac{1}{\sqrt{1-x^{2}}}$

Integrales

$\int dx = x+C$

$\int x^{n}\,dx = \dfrac{x^{n+1}}{n+1}+C \quad ; \quad n\neq -1$

$\int \dfrac{1}{x}\,dx = \ln|x|+C$

$\int e^{x}\,dx = e^{x}+C$

$\int a^{x}\,dx = \dfrac{a^{x}}{\ln a}+C$

$\int \operatorname{sen}(x)\,dx = -\cos(x)+C$

$\int \cos(x)\,dx = \operatorname{sen}(x)+C$

$\int \tan(x)\,dx = -\ln|\cos(x)|+C$

$\int \sec(x)\,\tan x\,dx = \sec(x)+C$

$\int \csc(x)\,\cot x\,dx = -\csc(x)+C$

$\int \operatorname{sen}^{2}(x)\,dx = \dfrac{x}{2}-\dfrac{\operatorname{sen}(2x)}{4}+C$

$\int \cos^{2}(x)\,dx = \dfrac{x}{2}+\dfrac{\operatorname{sen}(2x)}{4}+C$

$\int \sec^{2}(x)\,dx = \tan(x)+C$

$\int \csc^{2}(x)\,dx = -\cot(x)+C$

$\int \operatorname{senh}(x)\,dx = \cosh(x)+C$

$\int \cosh(x)\,dx = \operatorname{senh}(x)+C$

$\int \dfrac{1}{x^{2}+a^{2}}\,dx = \frac{1}{a}\arctan(\frac{x}{a})+C\,, \quad a>0$

$\int \dfrac{1}{\sqrt{1-x^{2}}}\,dx = \arcsin(x)+C$

$\int \dfrac{-1}{\sqrt{1-x^{2}}}\,dx = \cos(x)+C$

Derivadas Compuestas

donde $\square=g(x)$ es una función cualquiera de x

$f(x)=\sqrt{\square} \Rightarrow f'(x)=\dfrac{1}{2\sqrt{\square}}\cdot\square'$

$f(x)=e^{\square} \Rightarrow f'(x)=e^{\square}\cdot\square'$

$f(x)=a^{\square} \Rightarrow f'(x)=a^{\square}\cdot\ln(a)\cdot\square'$

$f(x)=\ln(\square) \Rightarrow f'(x)=\dfrac{1}{\square}\cdot\square'$

$f(x)=\log_{a}(\square) \Rightarrow f'(x)=\dfrac{1}{\square\cdot\ln(a)}\cdot\square'$

$f(x)=\operatorname{sen}(\square) \Rightarrow f'(x)=\cos(\square)\cdot\square'$

$f(x)=\cos(\square) \Rightarrow f'(x)=-\operatorname{sen}(\square)\cdot\square'$

$f(x)=\tan(\square) \Rightarrow f'(x)=\sec^{2}(\square)\cdot\square'$

Integración por Partes

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

Elegir u y dv con la regla **ILATE**:

Inversa trig. → Log. → Alg. → Trig. → Exp.