COLEGIO DE CIENCIAS Y HUMANIDADES
PLANTEL VALLEJO
ÁREA DE MATEMÁTICAS
CÁLCULO DIFERENCIAL E INTEGRAL I

Reglas Generales de Derivación

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

$$\frac{d}{dx}(cx) = c$$

$$\frac{d}{dx}\left(cx^n\right) = ncx^{n-1}$$

$$\frac{d}{dx}(u \pm v \pm w \pm \cdots) = \frac{du}{dx} \pm \frac{dv}{dx} \pm \frac{dw}{dx} \cdots$$

$$\frac{d}{dx}(cu) = c\frac{du}{dx}$$

$$\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$$

$$\frac{d}{dx}(uvw) = uv\frac{dw}{dx} + uw\frac{dv}{dx} + vw\frac{du}{dx}$$

$$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\left(du/dx\right) - u\left(dv/dx\right)}{v^2}$$

$$\frac{d}{dx}\left(u^n\right) = nu^{n-1}\frac{du}{dx}$$

$$\frac{dF}{dx} = \frac{dF}{du}\frac{du}{dx}$$ (Regla de la cadena)

Derivadas de las Funciones Trigonométricas

$$\frac{d}{dx}\operatorname{sen} u = \cos u\frac{du}{dx}$$

$$\frac{d}{dx}\cos u = -\operatorname{sen} u\frac{du}{dx}$$

$$\frac{d}{dx}\tan u = \sec^2 u\frac{du}{dx}$$

$$\frac{d}{dx}\cot u = -\csc^2 u\frac{du}{dx}$$

$$\frac{d}{dx}\sec u = \sec u \tan u\frac{du}{dx}$$

$$\frac{d}{dx}\csc u = -\csc u \cot u\frac{du}{dx}$$

Identidades Trigonométricas

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

$$\sec^2 A - \tan^2 A = 1$$

$$\csc^2 A - \cot^2 A = 1$$

$$\tan A = \frac{\operatorname{sen} A}{\cos A}$$

$$\cot A = \frac{\cos A}{\operatorname{sen} A}$$

$$\operatorname{sen} A \csc A = 1$$

$$\cos A \sec A = 1$$

$$\tan A \cot A = 1$$

$$\operatorname{sen}(-A) = -\operatorname{sen} A$$

$$\cos(-A) = \cos A$$

$$\tan(-A) = -\tan A$$

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

$$\cos^2 A = \tfrac{1}{2} + \tfrac{1}{2}\cos 2A$$

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

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

$$\operatorname{sen}(A \pm B) = \operatorname{sen} A \cos B \pm \cos A \operatorname{sen} B$$

$$\cos(A \pm B) = \cos A \cos B \mp \operatorname{sen} A \operatorname{sen} B$$

$$tan(A \pm B) = \frac{tanA \pm tanB}{1 \mp tanAtanB}$$

$$\operatorname{sen}\frac{A}{2} = \pm\sqrt{\frac{1-\cos A}{2}}$$

$$\cos\frac{A}{2} = \pm\sqrt{\frac{1+\cos A}{2}}$$

$$\operatorname{sen} A \operatorname{sen} B = \tfrac{1}{2}\left[\cos(A-B) - \cos(A+B)\right]$$

$$\operatorname{sen} A \cos B = \tfrac{1}{2}\left[\operatorname{sen}(A-B) + \operatorname{sen}(A+B)\right]$$

$$\cos A \cos B = \tfrac{1}{2}\left[\cos(A-B) + \cos(A+B)\right]$$

ELEAZAR GOMEZ LARA
ENE 2008

Derivadas de las Funciones Exponenciales y Logarítmicas

$$\frac{d}{dx}\log_a u = \frac{\log_a e}{u}\frac{du}{dx} \qquad a > 0, \quad a \neq 1$$

$$\frac{d}{dx}\ln u = \frac{d}{dx}\log_e u = \frac{1}{u}\frac{du}{dx}$$

$$\frac{d}{dx}a^u = a^u \ln a \frac{du}{dx}$$

$$\frac{d}{dx}e^u = e^u \frac{du}{dx}$$

$$\frac{d}{dx}u^v = \frac{d}{dx}e^{v\ln u} = e^{v\ln u}\frac{d}{dx}\left[v\ln u\right] = vu^{v-1}\frac{du}{dx} + u^v \ln u \frac{dv}{dx}$$

Propiedades:

- $log_a 1 = 0$
- $log_a a = 1$
- $log_a a^x = x$
- $a^{log_a x} = x$
- $log_a(u \cdot v) = log_a u + log_a v$
- $log_a\left(\frac{u}{v}\right) = log_a u - log_a v$
- $log_a\left(u^n\right) = n\,log_a u$
- $log_a \sqrt[n]{u} = \frac{1}{n}log_a u$

Cambio de Base :

$$log_a N = \frac{log_b N}{log_b a} \qquad ; log_a b = \frac{1}{log_b a}$$

Derivadas de las Funciones Trigonométricas Inversas

$$\frac{d}{dx}\operatorname{sen}^{-1}u = \frac{1}{\sqrt{1-u^2}}\frac{du}{dx} \qquad \left[-\tfrac{\pi}{2} < \operatorname{sen}^{-1}u < \tfrac{\pi}{2}\right]$$

$$\frac{d}{dx}\cos^{-1}u = \frac{-1}{\sqrt{1-u^2}}\frac{du}{dx} \qquad \left[0 < \cos^{-1}u < \pi\right]$$

$$\frac{d}{dx}\tan^{-1}u = \frac{1}{1+u^2}\frac{du}{dx} \qquad \left[-\tfrac{\pi}{2} < \tan^{-1}u < \tfrac{\pi}{2}\right]$$

$$\frac{d}{dx}\cot^{-1}u = \frac{-1}{1+u^2}\frac{du}{dx} \qquad \left[0 < \cot^{-1}u < \pi\right]$$

$$\frac{d}{dx}\sec^{-1}u = \frac{1}{|u|\sqrt{u^2-1}}\frac{du}{dx} = \frac{\pm 1}{u\sqrt{u^2-1}}\frac{du}{dx} \qquad \begin{bmatrix} +si & 0 < \sec^{-1}u < \frac{\pi}{2} \\ -si & \frac{\pi}{2} < \sec^{-1}u < \pi \end{bmatrix}$$

$$\frac{d}{dx}\csc^{-1}u = \frac{-1}{|u|\sqrt{u^2-1}}\frac{du}{dx} = \frac{\mp 1}{u\sqrt{u^2-1}}\frac{du}{dx} \qquad \begin{bmatrix} -si & 0 < \csc^{-1}u < \frac{\pi}{2} \\ +si & -\frac{\pi}{2} < \csc^{-1}u < 0 \end{bmatrix}$$

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