10. Tabla de derivadas

A continuación se exponen las derivadas de las funciones elementales (α, c y a son constantes reales, con $a > 0$, y $u = u(x)$ es una función de x):

$$(c)' = 0\,,$$

$$(x^\alpha)' = \alpha x^{\alpha-1}\,, \qquad (u^\alpha)' = \alpha u^{\alpha-1}u'\,,$$

$$(\sqrt{x}\,)' = \frac{1}{2\sqrt{x}}\,, \qquad (\sqrt{u}\,)' = \frac{u'}{2\sqrt{u}}\,,$$

$$(\log x)' = \frac{1}{x}\,, \qquad (\log u)' = \frac{u'}{u}\,,$$

$$(\log_a x)' = \frac{1}{x \log a}\,, \qquad (\log_a u)' = \frac{u'}{u \log a}\,,$$

$$(e^x)' = e^x\,, \qquad (e^u)' = u'e^u\,,$$

$$(a^x)' = a^x \log a\,, \qquad (a^u)' = u'a^u \log a\,,$$

$$(\operatorname{sen} x)' = \cos x\,, \qquad (\operatorname{sen} u)' = u' \cos u\,,$$

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

$$(\tan x)' = \sec^2 x\,, \qquad (\tan u)' = u' \sec^2 u\,,$$

$$(\operatorname{cotan} x)' = -\operatorname{cosec}^2 x\,, \qquad (\operatorname{cotan} u)' = -u' \operatorname{cosec}^2 u\,,$$

$$(\sec x)' = \sec x \tan x\,, \qquad (\sec u)' = u' \sec u \tan u\,,$$

$$(\operatorname{cosec} x)' = -\operatorname{cosec} x \operatorname{cotan} x\,, \qquad (\operatorname{cosec} u)' = -u' \operatorname{cosec} u \operatorname{cotan} u\,,$$

$$(\operatorname{arc\,sen} x)' = \frac{1}{\sqrt{1-x^2}}\,, \qquad (\operatorname{arc\,sen} u)' = \frac{u'}{\sqrt{1-u^2}}\,,$$

$$(\operatorname{arc\,cos} x)' = \frac{-1}{\sqrt{1-x^2}}\,, \qquad (\operatorname{arc\,cos} u)' = \frac{-u'}{\sqrt{1-u^2}}\,,$$

$$(\arctan x)' = \frac{1}{1+x^2}\,, \qquad (\arctan u)' = \frac{u'}{1+u^2}\,.$$

La segunda columna de derivadas se obtiene directamente de la primera aplicando la regla de la cadena.

11. Tabla de integrales

A continuación se exponen las integrales de las funciones elementales, la mayor parte de las cuales se obtienen directamente de la tabla de derivadas (en esta tabla, α es una constante real, a es una constante positiva, c es la constante de integración, y $u = u(x)$ es una función de x):

$$\int \alpha\, dx = \alpha\, x + c\,,$$

$$\int x^\alpha\, dx = \frac{x^{\alpha+1}}{\alpha+1} + c\,, \qquad \int u'\, u^\alpha\, dx = \frac{u^{\alpha+1}}{\alpha+1} + c\,, \quad \alpha \neq -1\,,$$

$$\int \frac{1}{x}\, dx = \log|x| + c\,, \qquad \int \frac{u'}{u}\, dx = \log|u| + c\,,$$

$$\int e^x\, dx = e^x + c\,, \qquad \int u'\, e^u\, dx = e^u + c\,,$$

$$\int a^x\, dx = \frac{a^x}{\log a} + c\,, \qquad \int u'\, a^u\, dx = \frac{a^u}{\log a} + c\,,$$

$$\int \operatorname{sen} x\, dx = -\cos x + c\,, \qquad \int u' \operatorname{sen} u\, dx = -\cos u + c\,,$$

$$\int \cos x\, dx = \operatorname{sen} x + c\,, \qquad \int u' \cos u\, dx = \operatorname{sen} u + c\,,$$

$$\int \sec^2 x\, dx = \tan x + c\,, \qquad \int u' \sec^2 u\, dx = \tan u + c\,,$$

$$\int \operatorname{cosec}^2 x\, dx = -\operatorname{cotan} x + c\,, \qquad \int u' \operatorname{cosec}^2 u\, dx = -\operatorname{cotan} u + c\,,$$

$$\int \sec x \tan x\, dx = \sec x + c\,, \qquad \int u' \sec u \tan u\, dx = \sec u + c\,,$$

$$\int \operatorname{cosec} x \operatorname{cotan} x\, dx = -\operatorname{cosec} x + c\,, \qquad \int u' \operatorname{cosec} u \operatorname{cotan} u\, dx = -\operatorname{cosec} u + c\,,$$

$$\int \tan x\, dx = -\log|\cos x| + c\,, \qquad \int u' \tan u\, dx = -\log|\cos u| + c\,,$$

$$\int \operatorname{cotan} x\, dx = \log|\operatorname{sen} x| + c\,, \qquad \int u' \operatorname{cotan} u\, dx = \log|\operatorname{sen} u| + c\,,$$

$$\int \sec x\, dx = \log\big|\sec x + \tan x\big| + c\,, \qquad \int u' \sec u\, dx = \log\big|\sec u + \tan u\big| + c\,,$$

$$\int \operatorname{cosec} x\, dx = -\log\big|\operatorname{cosec} x + \operatorname{cotan} x\big| + c\,, \qquad \int u' \operatorname{cosec} u\, dx = -\log\big|\operatorname{cosec} u + \operatorname{cotan} u\big| + c\,,$$

$$\int \frac{dx}{\sqrt{1-x^2}} = \operatorname{arc\,sen} x + c\,, \qquad \int \frac{u'\, dx}{\sqrt{1-u^2}} = \operatorname{arc\,sen} u + c\,,$$

$$\int \frac{dx}{x^2+1} = \arctan x + c\,, \qquad \int \frac{u'\, dx}{u^2+1} = \arctan u + c\,,$$

$$\int \frac{dx}{x^2+a} = \frac{1}{\sqrt{a}} \arctan \frac{x}{\sqrt{a}} + c\,, \qquad \int \frac{u'\, dx}{u^2+a} = \frac{1}{\sqrt{a}} \arctan \frac{u}{\sqrt{a}} + c\,, \quad \text{si } a > 0\,.$$

La segunda columna de primitivas se obtiene directamente de la primera aplicando un cambio de variable.