

Biomatemáticas

1: $y = \frac{2-y}{1+2x^2}$ $u = 2-y$ $u' = -y'$

$$\frac{dy}{dx} = \frac{u \frac{du}{dx} - u' \cdot \frac{dx}{dx}}{v^2}$$

$$= \frac{(1+2x^2)(1) - (2-y)(1+4x)}{(1+2x^2)^2}$$

$$= \frac{1+2x^2 - 2 - 4x + y + 4xy}{(1+2x^2)^2} = \frac{2x^2 - 4x + y + 4xy}{(1+2x^2)^2}$$

R: $\frac{2x^2 - 4x}{(1+2x^2)^2}$ ←

2: $y = u^6$
 $u = 1 + 2\sqrt{x}$

$$\frac{du}{dx} (u^6) = 6u^5 \frac{du}{dx}$$

$$\frac{d}{dx} (1+2\sqrt{x}) = 1 + 2 \cdot \frac{1}{2} = 1 + 1 = 2$$

$$6u^5 = 6(5)^5 = 6(3125) = 18750$$

3: $y = \ln(ax+b)$ $\frac{d}{dx} u$

$$u = ax+b \quad \frac{d}{dx} a = \frac{a}{ax+b}$$

$$u' = 0 \quad \frac{1}{ax+b}$$

↑

4: $y = \ln x^3$

$$\frac{d}{dx} \ln x^3 = \frac{d}{dx} x^3 = \frac{d}{dx} x^3 = \frac{3x^2}{x^3}$$

$$= \frac{3x^2}{x^3}$$

5: $y = 4x^2 \sqrt{x^2-1}$ *

$$u = 4(x^2-1)^{1/2}$$

$$v = \sqrt{x^2-1} = 1 - 2\sqrt{x^2-1}$$

$$\frac{dy}{dx} = \frac{du}{dx} \cdot \frac{dv}{dx} = \frac{d}{dx} (8x) \cdot \frac{d}{dx} \left(\frac{2x}{2\sqrt{x^2-1}} \right)$$

$$= \frac{8x \cdot 2x}{2\sqrt{x^2-1}} = \frac{16x^2}{2\sqrt{x^2-1}} = \frac{8x^2}{\sqrt{x^2-1}}$$

6: $y = \frac{a+y}{a+x}$ $\frac{dy}{dx} = \frac{a \frac{dy}{dx} - 0 \cdot \frac{dx}{dx}}{a+x}$

$$u = (a+y) \quad (a+y) \frac{dy}{dx} = (a-y) \frac{dy}{dx}$$

$$u = a+y \quad u' = 1$$

$$= \frac{(a+y)(-1) - (a-y)(1)}{a+y^2}$$

$$= \frac{a+y - a-y}{(a+y)^2} = \frac{-2y}{(a+y)^2}$$