DERIVADAS

FORMULAS DE DERIVACIÓN	EJEMPLOS
$y = K \quad y' = 0$ $K \in \mathbb{R}$	$y = 3 \quad y' = 0$ $y = -5 \quad y' = 0$ $y = \frac{3}{2} \quad y' = 0$ $y = \sqrt{2} \quad y' = 0$
$y = x^n \quad y' = n \cdot x^{n-1}$ $n \in \mathbb{R}$	$y = x \quad y' = 1 \cdot x^{1-1} = 1 \cdot x^0 = 1 \quad y' = 1$ $y = x^2 \quad y' = 2 \cdot x^{2-1} = 2 \cdot x^1 = 2x \quad y' = 2x$ $y = \frac{1}{x^2} = x^{-2} \quad y' = -2 \cdot x^{-2-1} = -2x^{-3} \quad y' = -\frac{2}{x^3}$ $y = \sqrt[3]{x^2} = x^{\frac{2}{3}} \quad y' = \frac{2}{3} x^{\frac{2}{3}-1} = \frac{2}{3} x^{-1/3} \quad y' = \frac{2}{3\sqrt[3]{x}}$
$y = K \cdot u \quad y' = K u'$ $K \in \mathbb{R}$; $u = \text{función}$	$y = 2x \quad y' = 2 \cdot (x)' = 2 \cdot 1 = 2 \quad y' = 2$ $y = 5x^2 \quad y' = 5 \cdot (x^2)' = 5 \cdot 2 \cdot x^{2-1} \quad y' = 10x$ $y = \frac{6}{x^3} = 6x^{-3} \quad y' = 6 \cdot (x^{-3})' = 6 \cdot (-3) \cdot x^{-4} \quad y' = \frac{-18}{x^4}$ $y = \frac{\sqrt[4]{x}}{2} = \frac{1}{2} x^{1/4} \quad y' = \frac{1}{2} \cdot (x^{1/4})' = \frac{1}{2} \cdot \frac{1}{4} x^{\frac{1}{4}-1} \quad y' = \frac{1}{8x^{3/4}} = \frac{1}{8\sqrt[4]{x^3}}$

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FÓRMULAS DE DERIVACIÓN	EJEMPLOS
$y = u \pm v \; ; \; y' = u' \pm v'$ u, v = funciones	$y = x^2+3 \; ; \; y' = (x^2)' + (3)' = 2x + 0 \quad y' = 2x$ $y = 3x^2+5 \; ; \; y' = (3x^2)' + (5)' = 3.2.x + 0 \quad y' = 6x$ $y = 6x^4 - 3x^3 + 5 \; ; \; y' = (6x^4)' - (3x^3)' + 5' = 6.4x^3 - 3.3x^2 + 0$ $y' = 24x^3 - 9x^2$ $y = \sqrt{x} - \frac{2}{x^2} \; ; \; y' = (x^{\frac{1}{2}})' - (2x^{-2})' = \frac{1}{2}x^{-\frac{1}{2}} - 2.(-2).x^{-3}$ $y' = \frac{1}{2\sqrt{x}} + \frac{4}{x^3}$
$y = u . v \quad y' = u'.v + u.v'$	$y = (x^2+1).(x^3+5x^2) \; ; \; y' = (x^2+1)'.(x^3+5x^2) + (x^2+1).(x^3+5x^2)' =$ $= 2x.(x^3+5x^2) + (x^2+1).(3x^2+10x)$ $= 2x^4 + 10x^3 + 3x^4 + 10x^3 + 3x^2 + 10x =$ $= 5x^4 + 20x^3 + 3x^2 + 10x$ $y = (5x^2+6x-2).\sqrt{x} \; ; \; y' = (5x^2+6x-2)'.\sqrt{x} + (5x^2+6x-2).(\sqrt{x})' =$ $= (10x+6).\sqrt{x} + (5x^2+6x-2).\frac{1}{2}x^{-1/2}$ $= 10x\sqrt{x} + 6\sqrt{x} + \frac{5x^2+6x-2}{2\sqrt{x}}$

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FÓRMULAS DE DERIVACIÓN

$$y = \frac{u}{v} \; ; \quad y' = \frac{u' \cdot v - u \cdot v'}{v^2}$$

$$y = u^n \; ; \quad y' = n \cdot u^{n-1} \cdot u'$$

EJEMPLOS

$$y = \frac{x^2-1}{x^2+1} \; ; \quad y' = \frac{(x^2-1)' \cdot (x^2+1) - (x^2-1)(x^2+1)'}{(x^2+1)^2} =$$

$$= \frac{2x(x^2+1) - (x^2-1) \cdot 2x}{(x^2+1)^2} = \frac{\cancel{2x^3}+2x-\cancel{2x^3}+2x}{(x^2+1)^2}$$

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

$$y = (x^2-5x+3)^8 \; ; \quad y' = 8 \cdot (x^2-5x+3)^7 \cdot (2x-5)$$

$$y = \underbrace{\frac{1}{(x^3-5x)^2}}_{\frac{u}{v} \rightarrow u^n} = (x^3-5x)^{-2} \qquad y' = -2 \cdot (x^3-5x)^{-3} \cdot (x^3-5x)' =$$

puedo colocar la función para derivar de otra manera

$$= -2 \cdot (x^3-5x)^{-3} (3x^2-5) =$$

$$= \frac{-2(3x^2-5)}{(x^3-5x)^3}$$

$$y = \sqrt{x^2+1} = (x^2+1)^{1/2} \qquad y' = \frac{1}{2}(x^2+1)^{-1/2} \cdot 2x = \frac{x}{\sqrt{x^2+1}}.$$

1° colocar

Realiza las siguientes derivadas:

$y = x^3 + \sqrt[3]{2x}$; $y' =$

$y = \sqrt{(3x^2+1)}$; $y' =$

potencias de igual base

$$y = x^2 \cdot \sqrt{x} + \frac{3x}{\sqrt{x}} = \underbrace{x^2 \cdot x^{1/2} + \frac{3x}{x^{1/2}}}_{\text{colocamos la función para que sea más fácil derivar}} = x^{5/2} + 3x^{1/2} \xrightarrow[\text{deriva}]{\text{Ahora}} y' =$$

$$y = \sqrt{\frac{3}{(x^2-5)^3}} = \underbrace{\qquad\qquad\qquad}_{\text{coloca primero la función}} \xrightarrow[\text{deriva}]{\text{Ahora}} y' =$$

$$y = \sqrt{\frac{2x^2+3}{x+1}} = \left(\frac{2x^2+3}{x+1}\right)^{\frac{1}{2}} \xrightarrow[\text{como } u^n]{\text{Ahora deriva}} y' =$$

colocamos la función para derivada como u^n

$$y = \underbrace{(3x^2-2)}_{u} \cdot \underbrace{(5x+3)^4}_{v} \; ; \; y' =$$