$\frac{-1}{3} \cdot \frac{3}{3}$

Diplomado en **Probabilidad e Inferencia Básica**

Quiz 4: Derivadas

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① $y = \left(\frac{2x+1}{3x-1}\right)^4 \quad y' = 4\left(\frac{2x+1}{3x-1}\right)^3\left[\frac{(2)(3x-1)-(3)(2x+1)}{(3x-1)^2}\right]$

$y' = 4\left(\frac{2x+1}{3x-1}\right)^3\left[\frac{6x-2-6x-3}{(3x-1)^2}\right] = 4\left(\frac{2x+1}{3x-1}\right)^3\left(\frac{-5}{(3x-1)^2}\right)$

$= -20\,\frac{(2x+1)^3}{(3x-1)^5}$

② $y = \frac{x}{\sqrt[3]{(x^2+4)}} \quad y' = (1)\frac{1}{\sqrt[3]{x^2+4}} + x(x^2+4)^{-4/3}\,2x(-1/3)$

$y' = \frac{1}{\sqrt[3]{x^2+4}} - \frac{2x^2}{3(\sqrt[3]{x^2+4})^4} =$

$= \frac{1}{\sqrt[3]{x^2+4}} \cdot \frac{3(\sqrt[3]{x^2+4})^3}{3(\sqrt[3]{x^2+4})^3} - \frac{2x^2}{3(\sqrt[3]{x^2+4})^4}$

$= \frac{3(x^2+4)-2x^2}{3(\sqrt[3]{x^2+4})^4} = \frac{3x^2+12-2x^2}{3(\sqrt[3]{x^2+4})^4} = \frac{x^2+12}{3(\sqrt[3]{x^2+4})^4}$

③ $f(x) = \frac{x^4+1}{x^2}$

$f'(x) = \frac{(4x^3)x^2-(2x)(x^4+1)}{x^4} = \frac{4x^5-2x^5-2x}{x^4} = \frac{2(x^4-1)}{x^3}$

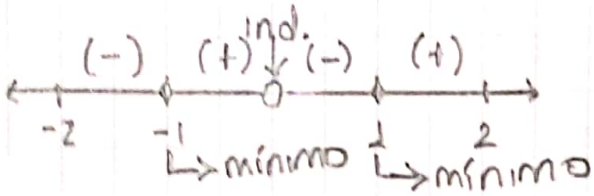
$f''(x) = 2\left[\frac{(4x^3)(x^3)-(3x^2)(x^4-1)}{x^6}\right] = 2\left[\frac{4x^6-3x^6+3x^2}{x^6}\right]$

$= 2\left[\frac{x^6+3x^2}{x^6}\right] = 2\left[\frac{x^4+3}{x^4}\right]$

Para hallar máximos y mínimos, $f'(x)=0$

$$f'(x)=\frac{2(x^4-1)}{x^3}=0$$

$$=2x-\frac{2}{x^3}=0 \Rightarrow 2x=\frac{2}{x^3} \Rightarrow x^4=1 \begin{cases} x=1 \\ x=-1 \end{cases}$$



$$f'(-2)=\frac{2((-2)^4-1)}{(-2)^3}=\frac{2(15)}{-8}=\frac{-30}{8}=\frac{-15}{4}$$

$$f'(-1/2)=\frac{2((-1/2)^4-1)}{(-1/2)^3}=\frac{2((1/16)-1)}{-1/8}=\frac{-30/16}{-1/8}=\frac{30(8)}{16}=15$$

$$f'(1/2)=\frac{2((1/2)^4-1)}{(1/2)^3}=\frac{2((1/16)-1)}{(1/2)^3}=\frac{-30/16}{1/8}=\frac{-30(8)}{16}=-15$$

$$f'(2)=\frac{2((2)^4-1)}{(2)^3}=\frac{2(15)}{8}=\frac{30}{8}=\frac{15}{4}$$

$$f''(1)=2\left[\frac{x^4+3}{x^4}\right]=2\left[\frac{(1)^4+3}{(1)^4}\right]=\underline{\underline{8}}=f''(-1)$$

↳ Ambos son mínimos, relativos y absolutos

$$f''(x)=2\left[\frac{x^4+3}{x^4}\right]=\frac{6}{x^4}+2=0$$

$$=\frac{6}{x^4}=-2 \rightarrow -3=x^4 \Rightarrow x=\sqrt[4]{-3}\ ??$$

No hay puntos de inflexión