Universidad Nacional Autonoma De Honduras

Metodos Cuantitativos III

Primer Examen, II -parcial
15 / Marzo / 2021

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(1) Calcule la $\frac{dy}{dx}$ por cada uno de los siguientes

problemas.

a. $y = x^2 (x^3 - 1)^4$

$g = x^2$

$h'(x) = (x^3 - 1)^4$

$g'(x) = 2x$

$h'(x) = 4(x^3 - 1)^3 (3x^2)$

$y' = 4x^2 (x^3 - 1)^3 (3x^2) + x^3 - 1)^4 (2x)$

$y'(x^3 - 1)^3 \left[12x^4 + (2x)(x^3 - 1) \right]$

b. $y = \sqrt[3]{\dfrac{8x^2 - 3}{x^2 + 3}}$

$\ln y = \ln\left(\sqrt[3]{\dfrac{8x^2 - 3}{x^2 + 2}}\right) \rightarrow \ln y = \dfrac{1}{3}\ln(8x^2 - 3) - \dfrac{1}{3}\ln(x^2 + 2)$

$$\dfrac{y'}{y} = \dfrac{1}{3}\left(\dfrac{16x}{8x^2 - 3}\right) - \dfrac{1}{3}\left(\dfrac{2x}{x^2 + 2}\right)$$

$$y' = \left[\dfrac{1}{3}\left(\dfrac{16x}{8x^2 - 3}\right) - \dfrac{1}{3}\left(\dfrac{2x}{x^2 + 2}\right)\right]$$

$$\left(\sqrt[3]{\dfrac{8x^2 - 3}{x^2 + 2}}\right)$$

c) $y \ln\left[(5x + 2)^6 (8x - 3)^4\right]$

$y = 6\ln[5x + 2] + 4\ln[8x - 3]$

$y = 6\left(\dfrac{5}{5x + 2}\right) + 4\left(\dfrac{8}{8x - 3}\right)$

$y = \dfrac{30}{5x + 2} + \dfrac{32}{8x - 3}$

d. $F(x) = \log_2 \left[\dfrac{x+1}{x-1} \right]$

$F'(x) = \dfrac{1}{\ln(2) \cdot \frac{x+1}{x-1}} \cdot \dfrac{(x-1) - (x+1)}{(x-1)^2}$

$F'(x) = \dfrac{1}{\ln(2) \cdot \frac{x+1}{x-1}} \cdot \dfrac{x-1-x-1}{(x-1)^2}$

$F'(x) = \dfrac{1}{\ln(2) \frac{x+1}{x-1}} \cdot \dfrac{2}{(x-1)\,2}$

$F(x) = \dfrac{2}{\ln(2)(x^2-1)}$

c. $F(x) = e\,e^x\,e^{x^2}$

$\ln(F(x))\ \ln\left[e\,e^x\,e^{x^2} \right]$

$\ln(F(x)) = \ln(e) + x\ln(e) + x^2 \ln(e)$

$\ln F(x) = 1 + x + x^2$

$\dfrac{F'(x)}{F(x)} = 1 + 2x$

$F'(x) = (1+2x)\left(e\,e^x\,e^{x^2} \right)$