Taller N° 2

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Curso: 4to ciclo "A" - Computación

- Hallar la derivada de las funciones

1. $y = x^5 + 5x^4 - 10x^2 + 6$

$y' = 5x^4 + 20x^3 - 20x + 0$ o $y' = 5x(x^3 + 4x^2 - 4)$ //

2. $y = \dfrac{1}{2x+3}$ Función recíproca $\left[\dfrac{1}{u(x)}\right]' = -\dfrac{\frac{d}{dx}u(x)}{u(x)^2}$

$y' = \dfrac{\frac{d}{dx}[2x+3]}{(2x+3)^2} = \dfrac{2 \cdot \frac{d}{dx}2x + \frac{d}{dx}3}{(2x+3)^2} = -\dfrac{2-1+0}{(2x+3)^2} = -\dfrac{2}{(2x+3)^2}$ //

3. $y = \sqrt{2x-1}$

$y' = 2x^{1/2} - 1^{1/2}$

$y' = \dfrac{d}{dx}2x^{1/2} - \dfrac{d}{dx}1^{1/2} = \left(\dfrac{1}{2}\right)2x^{1/2-1} - 0 = 1x^{-1/2} = \dfrac{1}{\sqrt{x}}$ //

4. $y = sen(x) \cdot Cos(x)$ $g(x) = sen(x)$ $h(x) = cos(x)$

$y' = sen(x) \cdot \dfrac{d}{dx}cos(x) + cos(x) \cdot \dfrac{d}{dx}Sen(x)$

$y' = sen(x) \cdot -sen(x) + cos(x) \cdot cos(x)$

$y' = -sen(x)^2 + cos(x)^2$ //

5. $y = 3x \cdot Cos\, x^3$ $g(x) = 3x$ $h(x) = cos\, x^3$

$y' = 3x \cdot \dfrac{d}{dx} cos\, x^3 + cos\, x^3 \cdot \dfrac{d}{dx} 3x$

Regla de la cadena. $\frac{d}{dx}(f(g)) = \frac{d}{dg}(f(g)) \cdot \frac{d}{dx}(g(x))$

$y' = 3x \cdot \frac{d}{dx}(\cos(g)) + \frac{d}{dx} x^3 + \cos x^3 \cdot 3$
$g = x^3$

$y' = 3x \cdot -\text{sen}(g) + 3x^2 + \cos x^3 \cdot 3$

$y' = 3x \cdot -\text{sen}\, x^3 + 3x^2 + 3\cos x^3 = -3x(+3x + \text{sen}\, x^2) \cdot 3\cos x^3$

$y' = -9x^2 + \text{sen}\, x^3 \cdot 3\cos x^3$ //

6. $y = x^2 \ln x^3$ $g(x) = x^2$
$h(x) = \ln x^3$

$y' = x^2 \cdot \frac{d}{dx} \ln x^3 + \ln x^3 \cdot \frac{d}{dx} x^2$
$g = x^3$

$y' = x^2 \cdot \frac{1}{g} \cdot \frac{d}{dx} x^3 + \ln x^3 \cdot 2x$

$y' = \cancel{x^2} \cdot \frac{1}{\cancel{x^3}} \cdot 3x^2 + \ln x^3 \cdot 2x = \frac{1}{x} \cdot 3x^2 + \ln x^3 \cdot 2x$

$y' = 3x + \ln x^3 \cdot 2x = 3x + 2x \cdot \ln x^3$ //

• Hallar la integral de las funciones.

1. $y = \frac{4x^6 + 3x^5 - 8}{x^5} = \int \frac{4x^6}{x^5} dx + \int \frac{3x^5}{x^5} dx - \int \frac{8}{x^5} dx$

$= 4\int \frac{x^6}{x^5} dx + 3\int \frac{x^5}{x^5} dx - 8\int \frac{1}{x^5} dx$

$= 4\int x\, dx + 3\int 1\, dx - 8\left(-\frac{1}{5-1 \cdot x^{5-1}}\right) \to \left(-\frac{1}{n-1 \cdot x^{n-1}}\right)$

$= \cancel{4}^{2} \frac{x^2}{\cancel{2}} + 3x + C - \cancel{8}^{2}\left(-\frac{1}{\cancel{4}x^4}\right)$

$= 2x^2 + 3x - \frac{2}{x^4} + C$

2. $y = (x+2)^3 = \int (x+2)^3 dx = \int_{u = x+2} (u)^3 dx = \frac{u^4}{4} + C$

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

3. $y = \frac{x+1}{\sqrt{x}} = \int \frac{x+1}{\sqrt{x}} dx = \int \frac{x+1}{x^{1/2}} dx = \int \frac{x^1}{x^{1/2}} dx + \int \frac{1}{x^{1/2}}$

$= \int x^{1-1/2} dx + \left(-\frac{1}{-1/2 \cdot x^{-1/2}}\right) = \int x^{1/2} + \left(-\frac{1}{-1/2 \cdot x^{-1/2}}\right)$

$= \frac{x^{3/2}}{\frac{3}{2}} - \frac{1}{-\frac{1}{2} \cdot x^{1/2}} = x^{3/2} \cdot \frac{2}{3} - \frac{1}{\frac{-1}{2} \cdot x^{1/2}} = \frac{2x^{3/2}}{3} - \frac{1}{\frac{-1}{2} \cdot x^{-1/2}}$

$= \frac{2\sqrt[2]{x^3}}{3} + \frac{x^{1/2}}{\frac{-1}{2}} = \frac{2\sqrt[2]{x^3}}{3} + 2x^{1/2} = 2\sqrt{x^3} + 2\sqrt{x}$

$= \frac{2x\sqrt{x}}{3} + 2\sqrt{x}$ //

4. $y = \frac{\sqrt{t} - t - t^3}{\sqrt[3]{t}} = \int \frac{\sqrt{t}}{\sqrt[3]{t}} dx - \int \frac{t}{\sqrt[3]{t}} dx - \int \frac{t^3}{\sqrt[3]{t}} dx$

$= \int t^{1/2 - 1/3} dx - \int t^{2/3} dx - \int t^{3 - 1/3}$

$= \int t^{1/6} dx - \int t^{2/3} dx - \int t^{8/3} dx$

$= \frac{t^{7/6}}{\frac{7}{6}} - \frac{t^{5/3}}{\frac{5}{3}} - \frac{t^{11/3}}{\frac{11}{3}}$

$= \frac{6 \cdot t^{7/6}}{7} - \frac{3t^{5/3}}{5} - \frac{3t^{11/3}}{11} + C$

$= \frac{3\sqrt[6]{t^7}}{7} - \frac{3\sqrt[3]{5}}{5} - \frac{3\sqrt[3]{t^{11}}}{11} + C$ //

5. $y = 3 \cdot \text{Sen } x \quad = 3\int \text{sen } x \quad = 3 - \cos x + C$

$= -3\cos x + C$

6. $y = \cos^2 x \quad = 2 \cdot \cos(x) \cdot \frac{d}{dx}[\cos(x)]$

$= 2\cos(x) - \text{Sen}(x)$

$= -2\cos(x) \cdot \sin(x)$