Instituto Superior Universitario Tecnológico del Azuay

Tecnología Superior en Big Data

Taller de ejercicios - Derivadas

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Materia:

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Ciclo:

Primer ciclo

Fecha:

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Taller de ejercicios - Derivadas

Resolver los siguientes ejercicios:

Actividad N°1:

1)

$$f(x) = (x^3 + 2x)e^x$$
$$f'(x) = (3x^2 + 2)e^x + (x^3 + 2x)e^x$$
$$f'(x) = (3x^2 e^x + 2e^x) + (x^3 e^x + 2xe^x)$$
$$f'(x) = x^3 e^x + 3x^2 e^x + 2xe^x + 2e^x$$

2)

$$y = \frac{x}{e^x}$$
$$y' = \frac{e^x - xe^x}{(e^x)^2}$$
$$y' = \frac{e^x(1 - x)}{(e^x)^2}$$
$$y' = \frac{1 - x}{e^x}$$

3)

$$g(x) = \frac{1 + 2x}{3 - 4x}$$
$$g'(x) = \frac{2(3 - 4x) - (1 + 2x)(-4)}{(3 - 4x)^2}$$
$$g'(x) = \frac{6 - 8x + 4 + 8x}{(3 - 4x)^2}$$
$$g'(x) = \frac{10}{(3 - 4x)^2}$$

4)

$$H(u) = (u - \sqrt{u})(u + \sqrt{u}) = (u - u^{1/2})(u + u^{1/2})$$
$$H'(u) = \left(1 - \frac{u^{-1/2}}{2}\right)(u + u^{1/2}) + (u - u^{1/2})\left(1 + \frac{u^{-1/2}}{2}\right)$$
$$H'(u) = \left(1 - \frac{1}{2\sqrt{u}}\right)(u + \sqrt{u}) + (u - \sqrt{u})\left(1 + \frac{1}{2\sqrt{u}}\right)$$
$$H'(u) = u - \frac{u}{2\sqrt{u}} + \sqrt{u} - \frac{1}{2} + u + \frac{u}{2\sqrt{u}} - \sqrt{u} - \frac{1}{2}$$
$$H'(u) = 2u - 1$$

5)

$$J(v) = (v^3 - 2v)(v^{-4} + v^{-2}) = v^{-1} + v - 2v^{-3} - 2v^{-1} = -v^{-1} + v - 2v^{-3}$$

$$J'(v) = v^{-2} + 1 + 6v^{-4}$$

$$J'(v) = \frac{6}{v^4} + \frac{1}{v^2} + 1$$

6)

$$F(y) = \left(\frac{1}{y^2} - \frac{3}{y^4}\right)(y + 5y^3) = \frac{1}{y} + 5y - \frac{3}{y^3} - \frac{15}{y} = 5y - \frac{3}{y^3} - \frac{14}{y}$$

$$F(y) = 5y - 3y^{-3} - 14y^{-1}$$

$$F'(y) = 5 + 9y^{-4} + 14y^{-2}$$

$$F'(y) = \frac{9}{y^4} + \frac{14}{y^2} + 5$$

7)

$$f(z) = (1 - e^z)(z + e^z) = z + e^z - ze^z - e^{2z}$$

$$f'(z) = 1 + e^z - (e^z + ze^z) - (2e^{2z})$$

$$f'(z) = 1 + e^z - e^z - ze^z - 2e^{2z}$$

$$f'(z) = -2e^{2z} - ze^z + 1$$

8)

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

$$y' = \frac{3x^2(1 - x^2) - x^3(-2x)}{(1 - x^2)^2}$$

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

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

9)

$$y = \frac{t^2 + 2}{t^4 - 3t^2 + 1}$$

$$y' = \frac{2t(t^4 - 3t^2 + 1) - (t^2 + 2)(4t^3 - 6t)}{(t^4 - 3t^2 + 1)^2}$$

$$y' = \frac{2t^5 - 6t^3 + 2t - (4t^5 - 6t^3 + 8t^3 - 12t)}{(t^4 - 3t^2 + 1)^2}$$

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$$y' = \frac{2t^5 - 6t^3 + 2t - 4t^5 + 6t^3 - 8t^3 + 12t}{(t^4 - 3t^2 + 1)^2}$$

$$y' = \frac{-2t^5 - 8t^3 + 14t}{(t^4 - 3t^2 + 1)^2}$$

10)

$$y = e^p(p + p\sqrt{p}) = e^p(p + pp^{1/2}) = e^p(p + p^{3/2})$$

$$y' = e^p(p + p^{3/2}) + e^p\left(1 + \frac{3p^{1/2}}{2}\right)$$

$$y' = e^p p + e^p p^{3/2} + e^p + \frac{3e^p p^{1/2}}{2}$$

$$y' = e^p p + e^p \sqrt{p^3} + \frac{3e^p \sqrt{p}}{2} + e^p$$

11)

$$y = \frac{v^3 - 2v\sqrt{v}}{v} = \frac{v(v^2 - 2v^{1/2})}{v} = v^2 - 2v^{1/2}$$

$$y' = 2v - \frac{1}{\sqrt{v}}$$

12)

$$f(t) = \frac{2t}{2 + \sqrt{t}}$$

$$f'(t) = \frac{2(2 + t^{1/2}) - 2t(\frac{t^{-1/2}}{2})}{(2 + \sqrt{t})^2}$$

$$f'(t) = \frac{4 + 2t^{1/2} - t^{1/2}}{(2 + \sqrt{t})^2}$$

$$f'(t) = \frac{4 + t^{1/2}}{(2 + \sqrt{t})^2}$$

$$f'(t) = \frac{4 + \sqrt{t}}{(2 + \sqrt{t})^2}$$

13)

$$f(x) = \frac{A}{B + Ce^x}$$

$$f'(x) = \frac{-A(Ce^x)}{(B + Ce^x)^2}$$

$$f'(x) = \frac{-ACe^x}{(B + Ce^x)^2}$$

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14)

$$g(x) = \sqrt{x}e^x$$

$$g'(x) = \left(\frac{x^{-1/2}}{2}e^x\right) + x^{1/2}e^x$$

$$g'(x) = \frac{e^x}{2\sqrt{x}} + e^x\sqrt{x}$$

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15)

$$y = \frac{e^x}{1 - e^x}$$

$$y' = \frac{e^x(1 - e^x) - e^x(-e^x)}{(1 - e^x)^2}$$

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

$$y' = \frac{e^x}{(1 - e^x)^2}$$

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16)

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

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17)

$$y = \frac{x + 1}{x^3 + x - 2}$$

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18)

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

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19)

$$y = \frac{1}{s + ke^s}$$

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20)

$$z = w^{3/2}(w + ce^w)$$

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21)

$$g(t) = \frac{t - \sqrt{t}}{t^{1/3}}$$

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22)

$$f(x) = \frac{1 - xe^x}{x + e^x}$$

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Actividad N°2:

1)

$$f(x) = 3x^2 - 2\cos x$$

2)

$$f(x) = \sqrt{x}\,\operatorname{sen} x$$

3)

$$f(x) = \operatorname{sen} x + \frac{1}{2}\cot x$$

4)

$$y = 2\sec x - \csc x$$

5)

$$y = \sec \tan$$

6)

$$g(\theta) = e^\theta(\tan -\theta)$$

7)

$$y = c\cos t + t^2\operatorname{sen} t$$

8)

$$f(t) = \frac{\cot t}{e^t}$$

9)

$$y = \frac{x}{2 - \tan x}$$

10)

$$y = \operatorname{sen}\theta\cos$$

11)

$$f(\theta) = \frac{\sec\theta}{1 + \sec\theta}$$

12)

$$y = \frac{\cos x}{1 - \operatorname{sen} x}$$

13)

$$y = \frac{t\operatorname{sen} t}{1 + t}$$

14)

$$y = \frac{1 - \sec x}{\tan x}$$

15)

$$f(x) = xe^x \csc x$$

16)

$$y = x^2 \operatorname{sen} x \tan x$$