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materia : calculo

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ejercicios de módulo

$$1. y = 2x^3 - 6x^2 - 7x + 11$$

$$y' = 6x^2 - 12x - 7$$

$$2. y = \frac{11}{4x^3} + \frac{7}{3x^2} \quad \frac{vdu - udv}{v^2}$$

$$\frac{11}{4} x^{3-1} = \frac{33}{4} x^2 +$$

$$y = \frac{33}{4} x^2 + \frac{14}{33} x$$

$$\frac{7}{3} x^2 = \frac{14}{33} x$$

$$3. y = 11 - 2x^2 - 6x^3$$

$$y' = -4x - 18x^2$$

$$4. y = \frac{x}{x^2 - 8x} \quad \frac{vdu - udv}{v^2}$$

$$v = x^2 - 8x \\ dv = 2x - 8$$

$$y' = \frac{x^2 - 8x - 2x^2 - 8x}{(x^2 - 8x)^2}$$

$$5. y = \frac{5}{3x-4} \quad \frac{u}{v} = \frac{du \cdot v - du \cdot v}{v^2}$$

$$u = 5 \quad v = 3x - 4 \\ du = 0 \quad dv = 3$$

$$y' = \frac{3 \cdot 5 - 0 \cdot (3x - 4)}{(3x - 4)^2}$$

$$y' = \frac{15}{3x - 4}$$

$$6. y = \frac{3x+2}{2x-1} \quad \frac{u}{v} = \frac{du \cdot v - u \cdot dv}{v^2} \quad \begin{matrix} u = 3x+2 \\ du = 3 \\ v = 2x-1 \\ dv = 2 \end{matrix}$$

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

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

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

$$7. y = \frac{3x^2+1}{2x} \quad v \frac{du}{v^2} = \frac{u \cdot dv - v \cdot du}{v^2} \quad \begin{matrix} u = 3x^2+1 \\ du = 6x \\ v = 2x \\ dv = 2 \end{matrix}$$

$$y' = \frac{2x(6x) - (3x^2+1)(2)}{(2x)^2}$$

$$y' = \frac{12x^2 - 6x^2 - 2}{4x^2}$$

$$y' = \frac{6x^2 - 2}{4x^2} = \frac{6x^2}{4x^2} - \frac{2}{4x^2}$$

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

$$8. y = \frac{5}{4+x^2} \quad \frac{dv \cdot u - du \cdot v}{v^2} \quad u = 5 \quad v = 4+x^2$$

$$du = 0 \quad dv = 2x$$

$$y' = \frac{4+x^2(5) - 0(2x)}{(4+x^2)^2}$$

$$y' = \frac{20+5x^2}{(4+x^2)^2}$$

$$9. y = (1+2x)^2 \quad \frac{d(u)^n}{dx} = n \cdot u^{n-1} \cdot \frac{du}{dx}$$

$$n = 2 \quad u = 1+2x$$

$$n-1 = 1 \quad du = 2$$

$$y' = 2 \cdot (1+2x) \cdot 2$$

$$y' = 2 + 4x \cdot 2$$

$$y' = 4 + 8x$$

$$10. y = \frac{3}{5x^2} + \frac{1}{4x} + \frac{1}{8}$$

$$\frac{3}{5} x^{-2} = \frac{6}{5} x^{-3}$$

$$y' = \frac{6}{5} x^{-3} - \frac{3}{4}$$

$$\frac{3}{4} x^{-1} = \frac{3}{4} x^{-2}$$

$$\frac{1}{8} \rightarrow 0$$

$$11. \frac{2x^4}{\tan x^2} \quad U = 2x^2 \quad V = \tan x^2$$

$$du = 4x \quad dv = 2x \sec^2 x^2$$

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

$$12. \frac{U}{3x^2} \left[\frac{V}{\cos 3x^2} \right] \quad U \cdot V = \frac{du \cdot v - dv \cdot u}{v^2}$$

$$U = 3x^2 \quad du = 6x$$

$$V = \cos 3x^2 \quad dv = -\sin 6x = -6x \sin 3x^2$$

$$y' = \frac{6x \cdot \cos 3x^2 - (-\sin 6x \cdot 3x^2)}{(\cos 3x^2)^2}$$

$$13. \sin x^2 \cos x^2 \quad U \cdot V = \frac{du \cdot v + dv \cdot u}{v^2}$$

$$U = \sin x^2$$

$$V = \cos x^2$$

$$du = 2x \cos x^2$$

$$dv = -2x \sin x^2$$

$$y' = -2x (\sin x^2)^2 + 2x (\cos x^2)^2$$

$$14. - \cot(3x^3) = \csc^2 u \frac{du}{dx}$$

$$- \csc^2 3x^3 (9x^2)$$

$$- 9x^2 \csc^2 3x^3$$

$$15. - \sqrt{2x^3 \cos x^2} \quad \text{Power Rule} \quad \frac{du}{dx} \quad 2x^3 \cdot \cos x^2$$

$$(2x^3 \cos x^2)^{1/2}$$

$$u = 2x^3 \quad v = \cos x^2$$

$$\frac{1}{2} \cdot (2x^3 \cos x^2)^{-1/2} \cdot (\quad) \quad du = 6x^2 \quad dv = -2x \sin x^2$$

$$\rightarrow -4x^4 \sin x^2 + 6x^2 \cos x^2$$

$$y' = \frac{-4x^4 \sin x^2 + 6x^2 \cos x^2}{2\sqrt{2x^3 \cos x^2}}$$

$$y' = \frac{-4x^4 \sin x^2 + 6x^2 \cos x^2}{\sqrt{2x^3 \cos x^2}}$$

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$$16. \sqrt{2x^3 \sec 2x}$$

$$u^n = n u^{n-1} \cdot \frac{du}{dx}$$

$$y' = (2x^3 \sec x^2)^{1/2}$$

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

$$u = 2x^3 \sec x^2$$

$$(2x^3) (2x \sec x^2 \tan x^2)$$

$$+ (6x^2) (\sec x^2)$$

$$6x^2 \sec x^2$$

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

$$y' = \frac{4x^4 \sec x^2 \tan x^2 + 6x^2 \sec x^2}{2 \sqrt{2x^3 \sec x^2}}$$

17. $(2x^3)^u$ $(\sqrt{5x^3})^v$

$$u \cdot v = du \cdot v + dv \cdot u$$

$$u = 2x^3$$

$$du = 6x^2$$

$$y' = 6x^2 \cdot (5x^3)^{1/2} + (15x^2)^{1/2} \cdot 2x^3$$

$$v = (5x^3)^{1/2}$$

$$dv = (15x^2)^{1/2}$$

$$y' = 6x^2 \cdot \sqrt{5x^3} + \sqrt{15x^2} \cdot 2x^3$$