



Mi Universidad

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Semestre: 4°

Materia: Calculo

Problemas de la unidad IV

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

$$y = \frac{d}{dx} (2x^3) - \frac{d}{dx} (6x^2) - \frac{d}{dx} (7x) + \frac{d}{dx} (11)$$

$$y = 2 \frac{d}{dx} (x^3) - 6 \frac{d}{dx} (x^2) - 7 \frac{d}{dx} (x)$$

$$\boxed{y' = 6x^2 - 12x - 7}$$

2. $y = 11/4 x^3 + 7/3 x^2$

$$y = \frac{d}{dx} \left(\frac{11}{4} x^3 \right) = \frac{11}{4} \cdot 3 x^2 = \frac{33}{4} x^2$$

$$y = \frac{d}{dx} \left(\frac{7}{3} x^2 \right) = \frac{7}{3} \cdot 2x = \frac{14}{3} x$$

$$y = \frac{dy}{dx} = \frac{33}{4} x^2 + \frac{14}{3} x$$

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

$$y = \frac{d}{dx} (-6x^3) - \frac{d}{dx} (2x^2) - \frac{d}{dx} (11)$$

$$y = 6 \frac{d}{dx} (x^3) - 2 \frac{d}{dx} (x^2)$$

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

$$4. Y = x / (x^2 - 8x)$$

$$\frac{d}{dx} \left(\frac{f(x)}{g(x)} \right) = \frac{f'(x)g(x) - f(x)g'(x)}{g(x)^2}$$

$$\frac{dy}{dx} = \frac{1(x^2 - 8x) - x(2x - 8)}{(x^2 - 8x)^2}$$

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

$$\frac{dy}{dx} = \frac{-x^2}{(x^2 - 8x)^2}$$

$$5. Y = 5 / (3x - 4)$$

$$Y = \frac{dy}{dx} = 5(-1)(3x - 4)^{-2} (3)$$

$$Y = \frac{dy}{dx} = -15(3x - 4)^{-2} = \frac{-15}{(3x - 4)^2}$$

$$Y = \frac{dy}{dx} = \frac{-15}{(3x - 4)^2}$$

$$6. Y = (3x + 2) / (2x - 1)$$

$$Y = \frac{dy}{dx} = \frac{f(x)g'(x) - f'(x)g(x)}{g(x)^2}$$

$$Y = \frac{dy}{dx} = \frac{3(2x - 1) - (3x + 2)}{(2x - 1)^2}$$

$$\frac{dy}{dx} = \frac{-7}{(2x - 1)^2}$$

$$7. y = (3x^2 + 1) / (2x)$$

$$y = \frac{dy}{dx} = \frac{f'(x)g(x) - f(x)g'(x)}{g(x)^2}$$

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

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

$$8. y = 5 / (4 + x^2)$$

$$y = 5(4 + x^2)^{-1}$$

$$y = \frac{dy}{dx} = 5(-1)(4 + x^2)^{-2} \cdot \frac{d}{dx}(4 + x^2)$$

$$y = \frac{dy}{dx} = -5 \cdot 2x \cdot (4 + x^2)^{-2} = \frac{-10x}{(4 + x^2)^2}$$

$$\frac{dy}{dx} = \frac{-10x}{(4 + x^2)^2}$$

$$9. y = (1 + 2x)^2$$

$$y = \frac{dy}{dx} = 2 \cdot u(x) \cdot u'(x)$$

$$y = \frac{dy}{dx} = 2(1 + 2x)(2) = 4(1 + 2x)$$

$$y = \frac{dy}{dx} = 4 + 8x$$

$$\frac{dy}{dx} = 4 + 8x$$

$$10. y = 3/5 x^2 - 3/4 x + 1/8$$

$$\frac{dy}{dx} = \frac{6}{5} x - \frac{3}{4}$$

$$\boxed{\frac{dy}{dx} = \frac{6}{5} x - \frac{3}{4}}$$

$$11. 2x^2 / \tan x^3$$

$$g(x) = \sec^2(x^2) \cdot 2x$$

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

$$\boxed{\frac{dy}{dx} = \frac{4x \cdot \tan(x^2) - 4x^3 \sec^2(x^2)}{\tan(x^2)^2}}$$

$$12. 5x^2 \cos 3x^2$$

$$\frac{d}{dx} = u \cdot v + v'$$

$$\frac{dy}{dx} = 6x \cdot \cos(3x^2) + 3x^2 \cdot (-\sin(3x^2) \cdot 6x)$$

$$= 6x \cdot \cos(3x^2) - 18x^3 \cdot \sin(3x^2)$$

$$\boxed{\frac{dy}{dx} = 6x \cos(3x^2) - 18x^3 \sin(3x^2)}$$

13. $\sin x^2 \cos x^2$

$$\cos(x^2) \cos(x^2)$$

$$(\cos(x^2) \cos(x^2) + (\cos(x^2) \cos(x^2$$

$$- \sin(x^2)(2x) \cos(x^2) + \cos(x^2)(- \sin(x^2)(2x)$$

$$- 2x) \sin(x) \cos(x^2) - 2x \sin(x^2) \cos(x^2)$$

14. $\cot 3x^3$

$$\frac{d}{dx} \cot(u) = -\csc^2(u) \cdot u'$$

$$\frac{du}{dx} = -\csc^2(3x^3) \cdot 9x^2$$

$$\frac{dy}{dx} = -9x^2 \cdot \csc^2(3x^3)$$

15. $\sqrt{2x^3} \cos x^2$

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

$$y = \frac{d}{dx} \cos(x^2) = -\sin(x^2) \cdot 2x$$

$$\frac{dy}{dx} = \frac{3x^2 \cos(x^2)}{\sqrt{2x^3}} - 2x \sqrt{2x^3} \cdot \sin(x^2)$$

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

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

$$\frac{dy}{dx} = \frac{3x^2}{\sqrt{2x^3}} \cdot \sec(2x) + \sqrt{2x^3} \cdot \sec(2x) \cdot \tan(2x) \cdot 2$$

$$17. 2x^3 \sqrt{5x^3}$$

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

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

$$\frac{dy}{dx} = 6x^2 \cdot \sqrt{5x^3} + 2x^3 \cdot \frac{15x^2}{2\sqrt{5x^3}}$$

$$2x^3 \cdot \frac{15x^2}{2\sqrt{5x^3}} = \frac{30x^5}{2\sqrt{5x^3}} = \frac{15x^5}{\sqrt{5x^3}}$$

$$\frac{dy}{dx} = 6x^2 \cdot \sqrt{5x^3} + \frac{15x^5}{\sqrt{5x^3}}$$

$$18.4 \sec 2x^4$$

$$u = 2x^4 - u' = 8x$$

$$\frac{dy}{dx} = 4 \cdot \sec(2x^4) \cdot \tan(2x^4) \cdot 8x^3$$

$$\frac{dy}{dx} = 32x^3 \sec(2x^4) \cdot \tan(2x^4)$$

$$\frac{dy}{dx} = 32x^3 \cdot \sec(2x^4) \cdot \tan(2x^4)$$

$$19. (\cos 2x^3)^3$$

$$y = (\cos(2x^3))$$

$$\frac{dy}{dx} 2x^3 = 6x$$

$$\frac{dy}{dx} = -18x^2 \cdot \cos^2(2x^3) \cdot \sin(2x^3)$$

$$20. 1 / (\sin x^2)^2$$

$$\frac{dy}{dx} = -2 \sin(x^2)^{-3} \cdot \cos(x^2) \cdot 2$$

$$\frac{dy}{dx} = -4x \cdot \frac{\cos(x^2)}{\sin^3(x^2)}$$

$$\frac{dy}{dx} = -\frac{4x \cdot \cos(x^2)}{\sin^3(x^2)}$$