

TEMA 6

1. Calcula las derivadas de las siguientes funciones

$$a) f(x) = \cos(4x^3 \sqrt{3-5x^2})$$

$$f'(x) = -\sin(4x^3 \sqrt{3-5x^2}) \cdot \left(12x^2 \sqrt{3-5x^2} + 4x^3 \cdot \frac{-10x}{2\sqrt{3-5x^2}}\right)$$

$$b) f(x) = \ln\left(\frac{\operatorname{tg} x}{\cos x^2}\right) + e^{3x^2}$$

$$f'(x) = \frac{1}{\frac{\operatorname{tg} x}{\cos x^2}} \cdot \left[\frac{(1 + \operatorname{tg}^2 x) \cdot \cos x^2 - \operatorname{tg} x \cdot (-\operatorname{sen} x^2) \cdot 2x}{(\cos x^2)^2} \right] + e^{3x^2} \cdot 6x$$

$$c) f(x) = \frac{5x \cdot \cos 7x}{\ln(2x^2 - 3x + 5)}$$

$$f'(x) = \frac{[5 \cdot \cos 7x + 5x(-\operatorname{sen} 7x) \cdot 7] \cdot \ln(2x^2 - 3x + 5) - (5x \cos 7x) \cdot \frac{4x - 3}{2x^2 - 3x + 5}}{\ln(2x^2 - 3x + 5)}$$

$$d) f(x) = \operatorname{arctg}(6x-3) + \operatorname{arccos}(\sqrt{6x^2+3})$$

$$f'(x) = \frac{1}{1+(6x-3)^2} \cdot 6 + \frac{-1}{\sqrt{1-(\sqrt{6x^2+3})^2}} \cdot \frac{12x}{2\sqrt{6x^2+3}}$$

e) Derivada quinta de $f(x) = \frac{5}{x^4}$

$$f(x) = \frac{5}{x^4} = 5x^{-4}$$

$$f'(x) = -20x^{-5}$$

$$f''(x) = 100x^{-6}$$

$$f'''(x) = -600x^{-7}$$

$$f^{(4)}(x) = 4200x^{-8}$$

$$f^{(5)}(x) = -33600x^{-9}$$