Clase 13/04

martes, 13 de abril de 2021 06:42 p. m.

$f(x) = y$

$f(x) = \cos x^{\tan x}$ $\qquad \widetilde{(f(x))^{g(x)}}$

x^3 ✓

3^x ✓

a) $x \cdot y = 6$ $\qquad \overset{x\ y}{(-6,-1)}$ $\qquad y'$ $\qquad f(x) \qquad f'(3)$

$y + x \cdot y' = 0$

$x y' = -y$

$y' = -\frac{y}{x} \Rightarrow y' = -\frac{-1}{-6} \Rightarrow y' = -\frac{1}{6}$

c) $\tan(x+y) = x$ $\qquad \boxed{(0,0)}$ $\qquad \tan x \qquad \sec^2 x$

$\sec^2(x+y)(1+y') = 1$ $\qquad (\quad)^2 = (\quad \cdot \quad)^2$

$\sec^2(x+y) + y'\sec^2(x+y) = 1$ $\qquad \sec^2 0 = \frac{1}{\cos 0} = 1$

$y' = \frac{1-\sec^2(x+y)}{\sec^2(x+y)} = \frac{1-1}{1} = 0$

Func. elevadas a funciones

$f(x) = (\cos x)^{\sin x}$ $\qquad x^3$

$\ln f(x) = \ln(\cos x)^{\sin x}$ $\qquad$ ✓ $(\cos x)^3 = 3\cos^2 x \cdot (-\sin x)$

$5^{\sin x'}$

$\to \ln f(x) = \sin x \cdot \ln(\cos x)$

$\frac{1}{f(x)} \cdot f'(x) = \cos x \ln(\cos x) + \sin x \cdot \frac{1}{\cos x} \cdot (-\sin x)$.

$f'(x) = f(x)\left[\cos x \ln(\cos x) - \frac{\sin^2 x}{\cos x}\right]$

$$\Rightarrow f'(x) = (\cos x)^{\operatorname{sen} x}\left[\cos x \ln(\cos x) - \frac{\operatorname{sen}^2 x}{\cos x}\right]$$

Ej

$$y = x^{x}$$

$$\ln y = \ln x^{x}$$

$$\ln y = x . \ln x .$$

$$\frac{1}{y} . y' = \ln x + \cancel{x} . \frac{1}{\cancel{x}}$$

$$y' = y[\ln x + 1]$$

$$y' = x^{x}[\ln x + 1]$$

$$\log_b A^n = n \log_b A$$

$$\ln(A . B) = \ln A + \ln B .$$

$$\boxed{x \tan x^5}^{\cos^2 x}$$

3)

$$f(x) = x^{\cos^2 x} \tan(x^5).$$

$$\ln f(x) = \ln\left[x^{\cos^2 x} . \tan x^5\right]$$

$$\ln f(x) = \ln(x^{\cos^2 x}) + \ln(\tan x^5)$$

$$\ln f(x) = \cos^2 x . \ln x + \ln(\tan x^5) .$$

$$\frac{1}{f(x)} . f'(x) = 2\cos x . (-\operatorname{sen} x) . \ln x + \cos^2 x . \frac{1}{x} + \frac{1}{\tan x^5} . \sec^2 x^5 . 5x^4 .$$

$$\frac{1}{x} + 2 = \frac{1+2x}{x}$$

$$f'(x) = f(x)\left[-2\cos x \operatorname{sen} x \ln x + \frac{\cos^2 x}{x} + \frac{5x^4 \sec^2 x^5}{\tan(x^5)}\right]$$

$$f'(x) = x^{\cos^2 x} \tan x^5\left[-2\cos x \operatorname{sen} x \ln x + \frac{\cos^2 x}{x} + \frac{5x^4 \sec^2 x^5}{\tan(x^5)}\right]$$

$$* \quad f(x) = x^{\cos^2 x} . \tan(x^5). \Rightarrow f'(x) = (\qquad) . \times$$

magia

$$f'(x) = \underbrace{(x^{\cos^2 x})'}_{a} \tan x^5 + x^{\cos^2 x}(\tan x^5)'.$$

$$a = x^{\cos^2 x}$$

$$\ln a = \ln x^{\cos^2 x}$$

$$\ln a = \cos^2 x . \ln x$$

$$\frac{1}{a} . a' = 2\cos x . (-\operatorname{sen} x) . \ln x + \cos^2 x . \frac{1}{x}$$

$$f'(x) = x^{\cos^2 x}\left[-2\cos x \operatorname{sen} x \ln x + \frac{\cos^2 x}{x}\right] \tan x^5 + x^{\cos^2 x} . \sec^2 x^5 . 5x^4$$

$x \;\; . \sec^2 x^5 . 5x^4$ //

$\frac{1}{a} . a' = 2\cos x . (-\operatorname{san} x) . \ln x + \cos^2 x . \frac{1}{x}$

$a' = x^{\cos^2 x}\left[-2\cos x \operatorname{san} x \ln x + \frac{\cos^2 x}{x}\right]$

Darivadas da Ordan Suparior.

$f(x) \Rightarrow \quad f'(x) \longrightarrow$ func.

$f''(x)$

$f'''(x)$

$f^{(4)}(x)$

$\vdots$

$f^{(3)}$

Ej $\quad f(x) = \operatorname{san}^4 x^2 \qquad f^{(2)}(x) = ?$

$f'(x) = 4 \operatorname{san}^3 x^2 . \cos x^2 . 2x$

$f'(x) = 8x \operatorname{san}^3(x^2) \cos(x^2)$.

$f^{(2)}(x) = 8 \operatorname{san}^3(x^2)\cos(x^2) + 8x\, 3 \operatorname{san}^2(x^2). \cos(x^2). 2x . \cos(x^2)$

$+ 8x \operatorname{san}^3(x^2).(-\operatorname{san} x^2). 2x$.

$f^{(2)}(x) = 8 \operatorname{san}^3(x^2)\cos(x^2) + 48x^2 \operatorname{san}^2(x^2)\cos^2(x^2) - 16x^2 \operatorname{san}^4(x^2)$. //

$f^{(3)}(x) =$

$\left(5^{\cos x}\right)' = 5^{\cos x} \ln 5 . (-\operatorname{san} x)$.

$5^{x\,'} = 5^x \ln 5$.

Ej $\quad y.x + 2x^2 = y \qquad y'' = ?$

$y'x + y. + 4x = y'$

$$y'x + y + 4x = y'$$

$$\boxed{y' = \frac{-y-4x}{x-1}}$$ cocianta.

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

y'''

$$y'' = \frac{\left(-\left(\frac{-y-4x}{x-1}\right)-4\right)(x-1) - (-y-4x)}{(x-1)2}$$

$y''' =$