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Ciencias da computação

Determine as derivadas parciais

a-) $f(x,y) = 5x^4 y^2 + x y^3 + 4$

$$\frac{d}{dx}\left(5x^4 f(x)^2 + x f(x)^3 + 4\right) = \frac{d}{dx}\left(5x^4 f(x)^2 + x f(x)^3 + 4\right)$$

$$= \frac{d}{dx}\left(5x^4 f(x)^2\right) + \frac{d}{dx}\left(x f(x)^3\right) + \frac{d}{dx}(4)$$

$$= \frac{d}{dx}\left(5x^4 f(x)^2\right) = 20 f(x)^2 x^3 = \frac{d}{dx} = \left(x f(x)^3\right) f(x)^3$$

$$\frac{d}{dx}(4) = 0 = \boxed{20 f(x)^2 x^3 + f(x)^3 + 0}$$

b-) $z = \cos xy$

c-) $z = \dfrac{x^3 + y^2}{x^2 + y^2}$

d) $f(x, y) = e^{-x^2-y^2}$

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

$e^{-x^2-f(x)^2}\frac{d}{dx}\left(-x^2-f(x)^2\right)$ / $e^{-x^2-f(x)^2}\frac{d}{x}\left(-x^2-f(x)^2\right)$

$\frac{d}{dx}\left(-x^2-f(x)^2\right) = -2x$ / $e^{-x^2-f(x)^2}(-2x) = \underline{-2e^{-x^2-f(x)^2}x}$

e) $z = x^2 \ln(1+x^2+y^2)$

f) $z = xy\ e^{xy}$

g) $f(x, y) = (4xy-3y^3)^3+5x^2y$

Se $f(x,y) = 16 - 4x^2 - y^2$, determine $f_x(1,2)$ e $f_y(1,2)$

$f_x(1,2) = 16 - 4.1^2 - 2^2 = 16 - 4 + 4 = \boxed{16}$

Se $f(x,y) = \sqrt{4 - x^2 - 4y^2}$, determine $f_x(1,0)$ e $f_y(1,0)$

$f(1,0) = \sqrt{4 - 1^2 - 4.0^2} = \sqrt{4+1} = \boxed{\sqrt{5}}$

Determine as derivadas parciais de primeira ordem da função

$f(x\ y) = 3x - 2y^4$

$\frac{d}{dx}(3x - 2f(x)^4) = 3$ / $\frac{d}{dx}(3x - 2f(x)^4)$ / $\frac{d}{dx}(3x) - \frac{d}{dx}(2f(x)^4)$

$\frac{d}{dx}(3x) = 3$ / $\frac{d}{dx}(2f(x)^4) = 0$ / $3 - 0 = \boxed{3}$

$f(x\ y) = x^5 + 3x^3y^2 + 3xy^4$

$d/dx(x^5 + 3x^3f(x)^2 + 3xf(x)^4) = 5x^4 + 9f(x)^2x^2 + 3f(x)^4$

$d/dx(x^5 + 3x^3f(x)^2 + 3xf(x)^4)$ / $d/dx(x^5) + d/dx(3x^3f(x)^2) + d/dx(3xf(x)^4)$

$d/dx(x^5) = 5x^4$ / $d/dx(3x^3f(x)^2) = 9f(x)^2x^2$ / $d/dx(3xf(x)^4) = 3f(x)^4$

$= \boxed{5x^4 + 9f(x)^2x^2 + 3f(x)^4}$

$z = x e^{3y}$

$f(x,y) = \frac{x-y}{x+y}$ / $\frac{d}{dx}\left(\frac{x-f(x)}{x+f(x)}\right) = \frac{2f(x)}{(x+f(x))^2}$

$\frac{d}{dx}\left(\frac{x-f(x)}{x+f(x)}\right)$ / $\frac{\frac{d}{dx}(x-f(x))(x+f(x)) - \frac{d}{dx}(x+f(x))(x-f(x))}{(x+f(x))^2}$

$\frac{d}{dx}(x-f(x)) = 1$ / $\frac{1(x+f(x)) - 1(x-f(x))}{(x+f(x))^2} = \boxed{\frac{2f(x)}{(x+f(x))^2}}$

$w = \text{sen}\, a \cos b$

$f(r,s) = r\ln(r^2+s^2)$

$\frac{d}{dr}(r\ln(r^2+s^2))$ / $\frac{d}{dr}(r)\ln(r^2+s^2) + \frac{d}{dr}(\ln(r^2+s^2))r$

$\frac{d}{dr}(\ln(r^2+s^2)) = \frac{2r}{r^2+s^2}$

$\ln(r^2+s^2) + \frac{2r^2}{r^2+s^2}$