

Lista 3.

A.

1. a) $f_x = \cos x \cos y - x \operatorname{sen} x \cdot \cos y$

$$f_y = -x \cos x \cdot \operatorname{sen} y$$

b) $f_x = 2x [1 + \ln(x^2 + y^2)]$

$$f_y = 2y [1 + \ln(x^2 + y^2)]$$

c) $f_x = \frac{y}{y^2 + x^2}$

$$f_y = \frac{-x}{(y^2 + x^2)}$$

d) $f_x = yx^{y-1}$

$$f_y = x^y \ln(x)$$

e) $f_x = x^2(x^3 + y^2 + 3)^{-\frac{2}{3}}$

$$f_y = \frac{2}{3y} y(x^2 + y^2 + 3)^{-\frac{2}{3}}$$

f) $f_x = \frac{\operatorname{sen}(y) \cos(x^2 + y^2) + 2x \operatorname{sen}(x^2 + y^2)}{\cos^2(x^2 + y^2)}$

$$f_y = \frac{x \cos(y) \cos(x^2 + y^2) + 2y \operatorname{sen}(x^2 + y^2)}{\cos^2(x^2 + y^2)}$$

2. a) $f_x = \frac{-x}{\sqrt{(x^2 + y^2 + z^2)^{-3}}}$; $f_y = \frac{-y}{\sqrt{(x^2 + y^2 + z^2)^{-3}}}$; $f_z = \frac{-z}{\sqrt{(x^2 + y^2 + z^2)^{-3}}}$

b) $f_x = ye^x \operatorname{sen}(xz) + yze^x \cos(xz)$; $f_y = e^x \operatorname{sen}(xz)$; $f_z = xye^x \cos(xz)$

3. a) $z_x(1,2) = \frac{2\sqrt{3}}{3}$; $z_y(0,0) = 0$

b) $z_y \left(\frac{2\pi}{b}, 0 \right) = 0$

B.

1. a) Não é diferenciável

b) Não é diferenciável

c) Diferenciável

d) Não é diferenciável

C.

1. $P = (0,0,1)$

2. a) $(0,99e^{0,02})^8 \approx 1,08$

b) $(0,99)^3 + (2,01)^3 - 6(0,99)(2,01) \approx -2,85$

c) $\sqrt{(4,01)^2 + (3,98)^2 + (2,02)^2} \approx 6$

3. $-xz^2 + 2x^2 - z^2 - 4x - yz^2 + 2y^2 - 4y - 3z^3 + 2xz + 2yz = 0$

D.

1. $-\text{sen}^2(t)e^{\cos(t)} - \text{sen}(t)e^{\text{sen}(t)} + \text{coste}^{\cos(t)} + \cos^2(t)e^{\text{sen}(t)}$

2. $\frac{dz}{dt} = 0$

3. $\frac{\partial \varphi}{\partial r} = 3r^2 \cos^2 \theta \text{sen} \theta - 4r^3 \cos \theta \text{sen}^3 \theta ;$

$$\frac{\partial \varphi}{\partial \theta} = r^3 (r \text{sen}^4 \theta - 2 \cos \theta \text{sen}^2 \theta + \cos^3 \theta - 3r \cos^2 \theta \text{sen}^2 \theta)$$

4. $\frac{\partial f}{\partial u} = \frac{159}{2} ; \frac{\partial f}{\partial v} = -168$

8. $\frac{\partial g}{\partial x}(1,1) = -4 ; \frac{\partial g}{\partial y} = 4$

E.

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