LISTA 07

WANDERSON FAUSTINO PATRICIO

QUESTÃO 01 a) $z = 3y^2 - 2x^2 + x$; $P_0 = (2, -1, -3)$

$z_x = 1 - 4x \Rightarrow z_x(P_0) = -7$; $z_y = 6y \Rightarrow z_y(P_0) = -6$

Portanto: $z - (-3) = -7 \cdot (x-2) - 6 \cdot (y+1) \Leftrightarrow 7x + 6y + 3 + 1 = 0$

b) $z = 3(x-1)^2 + 2(y+3)^2$; $P_0 = (2, -2, 5)$

$z_x = 6(x-1) \Rightarrow z_x(P_0) = 6$; $z_y = 4(y+3) \Rightarrow z_y(P_0) = 4$

$\Rightarrow z - 5 = 6(x-2) + 4(y+2) \Rightarrow 6x + 4y - z + 1 = 0$

c) $z = \sqrt{xy}$; $P_0 = (1, 1, 1)$

$z_x(P_0) = \frac{y}{2\sqrt{xy}} = \frac{1}{2} z_x(P_0)$

$z - 1 = \frac{1}{2}(x-1) + \frac{1}{2}(y-1) \Rightarrow x + y - 2z = 0$

d) $z = x \cdot e^{xy}$; $P_0 = (1, 1, e)$

$z_x = e^{xy} + xy\, e^{xy} \Rightarrow z_x(P_0) = 2e$; $z_y = x^2 \cdot e^{xy} \Rightarrow z_y(P_0) = e$

$z - e = 2e(x-1) + e(x-1) \Rightarrow 2ex + ey - z + 2e = 0$

e) $z = \ln(x - 2y)$; $P_0 = (1, 0, 0)$

$z_x = \frac{1}{x - 2y} \Rightarrow z_x(P_0) = 1$; $z_y = -\frac{2}{x - 2y} = -2$

$z = 1 \cdot (x-1) - 2y \Rightarrow x - 2y - z - 1 = 0$

Questão 02 a) $f(x,y) = 1 + x \cdot \ln(x \cdot y - 5)$; $(2,3)$

$D_f = \{(x,y) \in \mathbb{R}^2 / x \cdot y > 5\}$ $\Rightarrow (2,3) \in D_f$ é ponto de acumulação de D_f.

$f_x = \ln(xy-5) + \frac{xy}{xy-5} = 6$ e $f_y = \frac{x}{xy-5} = 2^2 = 4$

$\Rightarrow L(x,y) = 6x + 4y$

b) $f(x,y) = x^3 y^4$; $(1,1)$

$f(x+\Delta x, y+\Delta y) = (x+\Delta x)^3 \cdot (y+\Delta y)^4 = (x^3 + 3x^2\Delta x + 3x\Delta x^2 + \Delta x^3)(y^4 + 4y^3\Delta y + 6y^2\Delta y^2 + 4y\Delta y^3 + \Delta y$

$\Rightarrow f(x+\Delta x, y+\Delta y) = x^3 y^4 + (3x^2 y^4 \Delta x + 4y^3 x^3 \Delta y) + \varepsilon(\Delta x, \Delta y)$

c) $f(x,y) = \frac{x}{x+y}$; $(2,1)$

$f_x = \frac{(x+y)-x}{(x+y)^2} = \frac{y}{(x+y)^2} = 1/9$; $f_y = -\frac{x}{(x+y)^2} = -2/9$

$L(x,y) = 1/9 \cdot (x-2) + (-\frac{2}{9})(x-1) \Rightarrow \underline{L(x,y) = \frac{x}{9} - \frac{2y}{9}}$

f) $f(x,y) = \operatorname{sen}(x) + y$; $(0,3)$

$f_x = \cos x = 1$ e $f_y = 1$

$L(x,y) = (x-0) + (y-3) \Rightarrow \underline{L(x,y) = x + y - 3}$