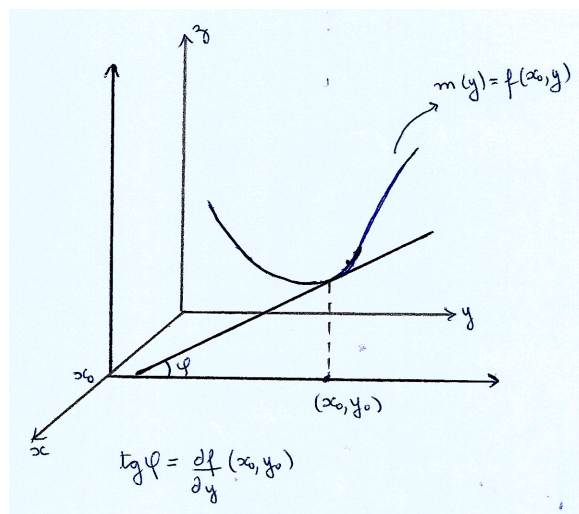
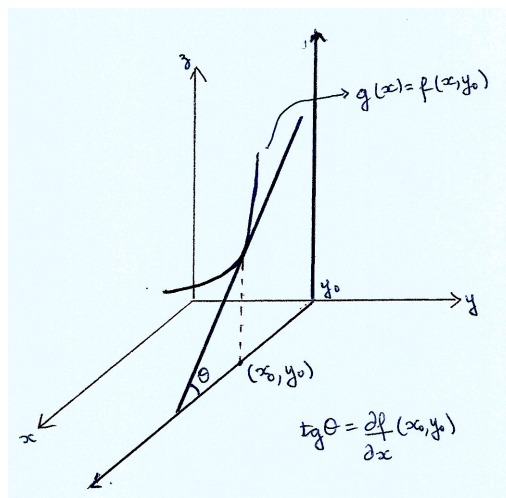


Lista 6 - MAT-2454



(I) Calcule $\frac{\partial z}{\partial x}$ e $\frac{\partial z}{\partial y}$, se existirem:

(1) $z = 3x^2y^3 - \frac{1}{xy} + 5$

(2) $z = \cos(x^3 + y^2)$

(3) $z = e^{xseny}$

(4) $z = x \ln x^4 + y^4 + 2$

(5) $z = \arctg \frac{y}{x}$

(6) $z = \frac{x^3 + 2y^2}{2x^2 + 4y}$

$$(7) z = \begin{cases} \frac{xy}{x^2 + y^2} & \text{se } (x, y) \neq (0, 0) \\ 0 & \text{se } (x, y) = (0, 0) \end{cases}$$

$$(8) z = \sec(x^4 y)$$

$$(9) z = \begin{cases} \frac{(x-1)^3}{(x-1)^2 + (y-2)^2} + 5x & \text{se } (x, y) \neq (1, 2) \\ 5 & \text{se } (x, y) = (1, 2) \end{cases}$$

$$(10) z = x^y$$

$$(11) z = \ln(x^7 y)$$

(II) Seja $z = \frac{x^2 y}{x^2 + y^2}$. Verifique que $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = z$

(III) Seja $g : \mathbb{R} \rightarrow \mathbb{R}$ uma função derivável tal que $g(0) = 2$ e $g'(0) = -1$. Considere a função $f(x, y) = 3xg(x^2 - y^2)$. Calcule $\frac{\partial f}{\partial x}(1, 1)$ e $\frac{\partial f}{\partial y}(1, 1)$.

(IV) Seja $\varphi : \mathbb{R} \rightarrow \mathbb{R}$ uma função derivável tal que $\varphi(1) = 3$ e $\varphi'(1) = 2$. Considere a função $g(x, y) = (2x^3 + 3y)\varphi\left(\frac{y}{x}\right)$. Calcule $\frac{\partial g}{\partial x}(3, 3)$ e $\frac{\partial g}{\partial y}(3, 3)$.

(V) Seja $f(x, y) = \int_0^{x^2 - y^4} e^{-t^2} dt$. Calcule $\frac{\partial f}{\partial x}(4, 2)$ e $\frac{\partial f}{\partial y}(4, 2)$.

(VI) Calcule $\frac{\partial x}{\partial x}$ e $\frac{\partial f}{\partial y}$, sendo $f(x, y) = \begin{cases} \frac{x^2 - y^3}{x^2 + y^2} & \text{se } (x, y) \neq (0, 0) \\ 0 & \text{se } (x, y) = (0, 0) \end{cases}$