

Cálculo Diferencial e Integral 2

Respostas à Ficha de Trabalho 3

1. $\begin{bmatrix} 2 & -2 \\ 3 & -3 \\ 3 & -3 \end{bmatrix}$

2. $4t^3$.

3. 18.

4. $\begin{bmatrix} 1 \\ 4 \\ 7 \end{bmatrix}$

5. a) 1.

b) 2.

6. Recta normal: $\{(1, \frac{3\sqrt{3}}{2}) + t(\frac{1}{2}, \frac{\sqrt{3}}{3}) : t \in \mathbb{R}\}$; Recta tangente: $\frac{1}{2}x + \frac{\sqrt{3}}{3}y = 2$.

7. Recta tangente: $\{(1, 1, 0) + t(1, 0, 1) : t \in \mathbb{R}\}$; Plano normal: $x + z = 1$.

8. Recta normal: $\{(0, 1, 0) + t(0, 2, 1) : t \in \mathbb{R}\}$; Plano tangente: $2y + z = 2$.

9.

$$\frac{\partial g}{\partial u}(c) \left[e^x + 2x \frac{\partial g}{\partial u}(a) + y \frac{\partial g}{\partial v}(a) + \frac{\partial g}{\partial w}(a) \right] + y \frac{\partial g}{\partial v}(c) + \frac{\partial g}{\partial w}(c) \left[\frac{\partial g}{\partial u}(b) + \frac{\partial g}{\partial v}(b) + \frac{\partial g}{\partial w}(b) \right]$$

onde $g = g(u, v, w)$ e

$$a = (x^2, xy, x+y), b = (x, x, x), c = (g(x^2, xy, x+y) + e^x, xy, g(x, x, x)).$$

10. $Dg(x, y) = \left[-\frac{\frac{\partial F}{\partial x}(x, y, g(x, y))}{\frac{\partial F}{\partial z}(x, y, g(x, y))} \quad -\frac{\frac{\partial F}{\partial y}(x, y, g(x, y))}{\frac{\partial F}{\partial z}(x, y, g(x, y))} \right]$

11. $(1, 0, 0), (\frac{1}{2}, 0, \frac{\sqrt{2}}{2})$ e $(\frac{1}{2}, 0, -\frac{\sqrt{2}}{2})$.

12. $(0, 1, -3)$ e $(0, -1, 3)$.