Instituto Superior Técnico
Departamento de Matemática
Secção de Álgebra e Análise

Cálculo Diferencial e Integral 2
Respostas à Ficha de Trabalho 4

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

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

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

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

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

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