Cálculo Diferencial e Integral 2 Respostas à Ficha de Trabalho 3

1. (a)
$$\frac{\partial f}{\partial x} = \frac{2x}{x^2 + y^2}$$
; $\frac{\partial f}{\partial y} = \frac{2y}{x^2 + y^2}$.

(b)
$$\frac{\partial g}{\partial x} = -\frac{y}{x^2}$$
; $\frac{\partial g}{\partial y} = \frac{1}{x}$.

2.
$$\frac{\partial f}{\partial x}(0,0) = 0; \frac{\partial f}{\partial y}(0,0) = 1.$$

3. (a)
$$\begin{bmatrix} y & x \\ \frac{1}{x} & \frac{1}{y} \end{bmatrix}$$

(b)
$$\begin{bmatrix} \frac{y}{2\sqrt{xy}} & \frac{x}{2\sqrt{xy}} & 0\\ 0 & ze^{yz} & ye^{yz} \end{bmatrix}$$

(c)
$$\begin{bmatrix} 0 & 2y & 0 \\ z & -1 & x \\ y & x & 1 \end{bmatrix}$$

(d)
$$\begin{bmatrix} -yz & -xz + 2y & -xy + 2 \end{bmatrix}$$

(e)
$$\begin{bmatrix} 3t^2 \\ -e^{-t} \\ -\frac{1}{t^2} \end{bmatrix}$$

5.
$$(1, -\frac{8}{5})$$
 por exemplo.

6. Basta ver que
$$\frac{\partial f}{\partial x}(0,0)=\frac{\partial f}{\partial y}(0,0)=0,$$
 $\lim_{(x,y)\to(0,0)}\frac{|f(x,y)|}{\sqrt{x^2+y^2}}=0.$

7. Apenas a função h é diferenciável na origem.

8. (a)
$$\frac{\partial f}{\partial x}(0,1) = 1$$
, $\frac{\partial f}{\partial y}(0,1) = 0$

(c)
$$\frac{18}{13}$$