

Respostas Lista 11

$$1. f_x = \sqrt{x}, f_y = 0$$

$$2. f_x = 2 + 6xy^4, f_y = 12x^2y^3$$

$$3. g_u = \frac{u^4 + 3u^2v^2 - 2uv^3}{(u^2 + v^2)^2}$$

$$g_v = \frac{u^4 + 3u^2v^2 - 2uv^3}{(u^2 + v^2)^2}$$

$$4. f_x = \frac{-x}{\sqrt{4-x^2-9y^2}}, f_y = \frac{-9y}{\sqrt{4-x^2-9y^2}}$$

$$5. z_x = \frac{-(1-x^{2/3})^2}{x^{1/3} \sqrt{(1-x^{2/3})^3 - y^2}}$$

$$z_y = \frac{-y}{\sqrt{(1-x^{2/3})^3 - y^2}}$$

$$6. z_x = 6xy \sin^2(xy) \cos(xy)$$

$$z_y = 3x^2 \sin^2(xy) \cos(xy)$$

$$7. f_x = 2xy^5 + z^2, f_y = 5x^2y^4, f_z = 2xz$$

$$8. \quad f_x = \frac{-y^2 - zy - z^2}{(xy + yz + zx)^2}$$

$$f_y = \frac{-x^2 - xz - z^2}{(xy + yz + zx)^2}$$

$$f_z = \frac{-x^2 - xy - y^2}{(xy + yz + zx)^2}$$

$$9. \quad W_x = e^x (\cos y + \tan z)$$

$$W_y = -e^x \sin y$$

$$W_z = e^x \cos z$$

$$10. \quad W_x = \frac{yz^2}{\sqrt{1 - (xyz^2)^2}}, \quad W_y = \frac{xz^2}{\sqrt{1 - (xyz^2)^2}}$$

$$W_z = \frac{2xyz}{\sqrt{1 - (xyz^2)^2}}$$

$$11. f_x = 6x - \sqrt{2}y^2$$

$$f_y = -2\sqrt{2}xy + 5y^4$$

$$f_{xy} = -2\sqrt{2}y = f_{yx}$$

$$f_{xx} = 6$$

$$f_{yy} = -2\sqrt{2}x + 20y^3$$

$$12. f_x = 2x, f_y = -2y$$

$$f_{xy} = f_{yx} = 0, f_{xx} = 2, f_{yy} = -2$$

$$13. f_x = \frac{x}{\sqrt{x^2+y^2}}, f_y = \frac{y}{\sqrt{x^2+y^2}}$$

$$f_{xy} = f_{yx} = \frac{-xy}{(x^2+y^2)^{3/2}}$$

$$f_{xx} = \frac{y^2}{x^2+y^2}, f_{yy} = \frac{x^2}{x^2+y^2}$$

$$14. \quad f_x = \frac{y^2 - x^2}{(x^2 + y^2)^2} \quad , \quad f_y = \frac{-2xy}{(x^2 + y^2)^2}$$

$$f_{xy} = f_{yx} = \frac{2y(3x^2 - y^2)}{(x^2 + y^2)^3}$$

$$f_{xx} = \frac{2x(x^2 - 3y^2)}{(x^2 + y^2)^3}$$

$$f_{yy} = \frac{-2x(1 - 4y^2)}{(x^2 + y^2)^2}$$

$$15. \quad \frac{dz}{dt} = 2 - 18e^{6t}$$

$$16. \quad \frac{dz}{dt} = 2t \cos t^2 - 3t^2 \sin t^3$$

$$17. \quad \frac{dz}{dt} = \frac{1 + 12t^2}{t\sqrt{2 \ln t - 4 - 12t^2}}$$

$$18. \quad \frac{dw}{dt} = \frac{\sin t \cos^2 t + \cos^2 t + \sin^3 t - 1}{\sin t \cos^2 t}$$

$$19. \quad \frac{dw}{dt} = \frac{e^{2t} - e^{-2t} + 4t}{\sqrt{e^{2t} + e^{-2t} + 4t^2}}$$

$$20. \frac{dw}{dt} = 9t^2 \cos(3t^3)$$

$$21. \frac{dw}{dt} = -(2t+1)e^{-t^2-t}$$

$$22. \frac{dw}{dt} = 6t^5 \cos(t^6)$$

$$23. \frac{\partial z}{\partial u} = \frac{-12}{u^4 v} - \frac{1}{v} \Rightarrow \frac{\partial z}{\partial v} = \frac{-4}{u^3 v^2} + \frac{u}{v^2}$$

$$24. \frac{\partial z}{\partial u} = \frac{2(u-v) - 4u(u^2+v^2)}{(u-v)^2 - (u^2+v^2)^2}$$

$$\frac{\partial z}{\partial v} = \frac{-2(u-v) - 4v(u^2+v^2)}{(u-v)^2 - (u^2+v^2)^2}$$

$$25. \frac{\partial z}{\partial u} = 4(u+v) \cos 2(u+v)^2 \cos 3(u-v)^2 - 6(u-v) \sin 2(u+v)^2 \sin 3(u-v)^2$$

$$\frac{\partial z}{\partial v} = 4(u+v) \cos 2(u+v)^2 \cos 3(u-v)^2 + 6(u-v) \sin 2(u+v)^2 \sin 3(u-v)^2$$

$$26. \frac{\partial z}{\partial u} = u^{v-1} (1+v \ln u) + \frac{v}{u^2} (1-\ln u)$$

$$\frac{\partial z}{\partial v} = \left(u^v \ln u + \frac{1}{u} \right) \ln u$$

$$27. \frac{\partial w}{\partial u} = \frac{2}{u+v}, \quad \frac{\partial w}{\partial v} = \frac{2}{u+v}$$

$$28. \frac{\partial w}{\partial u} = 0, \quad \frac{\partial w}{\partial v} = 5e^v$$

$$29. (D_{\hat{u}} f)(2,1) = \frac{16}{\sqrt{2}}$$

$$30. (D_{\hat{u}} f)(0, \frac{\pi}{4}) = 0$$

$$31. (D_{\hat{u}} f)(1, -1) = \frac{12}{\sqrt{13}}$$

$$32. (D_{\hat{u}} f)(2, \pi) = \frac{3\pi - 8}{2e}$$

$$33. (D_{\hat{u}} f)\left(\frac{\pi}{3}, -\frac{2\pi}{3}\right) = -\frac{13}{20}$$

$$34. (D_{\vec{a}} f)(1,1) = 0$$

$$35. (D_{\vec{a}} f)(3,4) = \frac{96 + 72\sqrt{3}}{65}$$

$$36. (D_{\vec{a}} f)\left(\frac{1}{2}, \frac{1}{4}\right) = 0$$