

Lista 4.

A.

1. a) $\nabla f(-2,2) = (1/2, 1/4)$

b) $\nabla f(-2,0) = (-4,0)$

c) $\nabla f(2,-1) = (4,2)$

2. a) $z(-z^2 + z + 2yz^2 - 4yz + 2y - 2) + x = 0$

b) $x = 2 + t; y = -1; z = 1 + 3t$

3. a) $Duf = \frac{-11}{4\sqrt{13}}$

b) $Duf = \frac{-5}{6}$

4. a) $Duf = \sqrt{392}$; ocorre na direção de ∇f .

b) $Duf = \sqrt{56}$; ocorre na direção de ∇f .

5.

a) $f_x(1,2) = 5$

b) $f_y(1,2) = 10$

c) $u = (-1,-2), D_u f(1,2) = -5\sqrt{5}$

B.

1. a) $f_{xx} = 6; f_{xy} = 0; f_{yx} = 0; f_{yy} = 4$

b) $f_{xx} = 2 \cos(x^2 - 3xy) - (4x^2 - 12xy + 9y^2) \operatorname{sen}(x^2 - 3xy)$;

$f_{xy} = -3 \cos(x^2 - 3xy) + (6x^2 - 9xy) \operatorname{sen}(x^2 - 3xy)$;

$f_{yx} = -3 \cos(x^2 - 3xy) + (6x^2 - 9xy) \operatorname{sen}(x^2 - 3xy)$;

$f_{yy} = -9x^2 \operatorname{sen}(x^2 - 3xy)$

c) $f_{xx} = e^{2xy}(2y^2 + 8xy^3 + 4x^2y^4)$;

$$\begin{aligned}f_{xy} &= e^{2xy}(4xy + 10x^2y^2 + 4x^3y^3); \\f_{yx} &= e^{2xy}(4xy + 10x^2y^2 + 4x^3y^3); \\f_{yy} &= e^{2xy}(2x^2 + 8x^3y + 4y^2x^4)\end{aligned}$$