



Listado 3
Soluciones
Cálculo III (521227)

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

ii) f no es diferenciable en $(0,0)$.

3. i) f continua en todo $\mathbb{R}^3$.

ii)

$$\frac{\partial f}{\partial x}(x, y, z) = \begin{cases} \frac{yz \left(x^2 + y^2 + z^2 + x^{\frac{1}{2}} \right) - xyz \left(2x + \frac{1}{2} x^{-\frac{1}{2}} \right)}{\left(x^2 + y^2 + z^2 + x^{\frac{1}{2}} \right)^2} + 3, & x > 0 \\ \frac{yz}{y^2 + z^2}, & x = 0 \wedge yz \neq 0 \\ 0, & x = 0 \wedge yz = 0 \\ \frac{yz \left(x^2 + y^2 + z^2 + (-x)^{\frac{1}{2}} \right) - xyz \left(2x - \frac{1}{2} (-x)^{-\frac{1}{2}} \right)}{\left(x^2 + y^2 + z^2 + x^{\frac{1}{2}} \right)^2} + 3, & x < 0 \end{cases}$$

iii) $\frac{\partial^2 f}{\partial y \partial x}(0,0,0) = 0$

5. $9x - 3y + z = 18$; $X(t) = [9t + 1, -3t - 2, t + 3]$

6. $6x + 3y - z = 11$

7. $\frac{4}{\sqrt{2}}$; $[17, 13, 11]$; $\sqrt{579}$

8. $a = 6$; $b = 24$; $c = -8$

9. $\left[\frac{2}{\sqrt{5}}, -\frac{1}{\sqrt{5}} \right]$ ó $\left[-\frac{2}{\sqrt{5}}, \frac{1}{\sqrt{5}} \right]$

10. $(1,0) ; (0,1)$

11. $\frac{\sqrt{2}}{\pi} ; \left[\frac{1}{\pi}, \frac{1}{\pi} \right] ; \frac{2}{\pi}$

12. i) f es continua en $(0,0)$.

ii) f no es diferenciable en el origen.

iii) $\frac{2}{5}$

iv) $x - 2z = 0$

v) $\frac{1}{\sqrt{5}}$

vi) $\left[\frac{1}{2}, 0 \right]$

13. $(2,2,0), \frac{\sqrt{5}}{10}$ segundos.