

+ Listo 8 | Parte 1.

→ Plano tangente e Aproxim.  
com lineares.

$$17. e^x \cos(xy) \approx 1$$

$$f(x,y) \approx f(0,0) + f_x(0,0)(x-0) + f_y(0,0)(y-0) \rightarrow$$

$$f(0,0) = e^0 \cdot \cos(0) = 1$$

$$f_x(x,y) = e^x (\cos(xy) - y \sin(xy))$$

$$f_x(0,0) = e^0 (\cos(0) - 0 \cdot \sin(0)) = 1$$

$$f_y(x,y) = -e^x \sin(xy)$$

$$f_y(0,0) = -e^0 \sin(0) = 0$$

$$\text{Subst.: } 1 + 1 \cdot x + 0 = \underline{x+1}$$

$$19. f(2,5) = 6; f_x(2,5) = 1, \text{ and } f_y(2,5) = -1$$

$$f(2.2; 4.9) = ?$$

$$f(x,y) \approx f(2,5) + f_x(2,5)(x-2) + f_y(2,5)(y-5) \rightarrow$$

$$6 + 1(x-2) + (-1) \cdot (y-5) =$$

$$6 + (2.2-2) + (5-4.9) = 6.3$$

$$25- Z = e^{-2x} \cos 2\pi t$$

$$dz = \frac{dz}{dx} \cdot dx + \frac{dz}{dy} \cdot dy$$

$$\text{Em } x: \frac{dz}{dx} = (-2) \cdot e^{-2x} \cdot \cos(2\pi t)$$

$$\text{Em } y: \frac{dz}{dy} = e^{-2x} \cdot 2\pi (-\sin 2\pi t)$$

Substituindo obtemos:

$$-2e^{-2x} \cdot \cos(2\pi t) - 2\pi e^{-2x} \cdot \sin(2\pi t)$$

$$31) Z = 5x^2 + y^2$$

$$(1, 2) \rightarrow (1.05; 2.1)$$

$$dx = \Delta x = (1.05 - 1) = (0.05)$$

$$dy = \Delta y = (2.1 - 2) = (0.1)$$

$$\frac{dz}{dx} = 10x \quad \text{e} \quad \frac{dz}{dy} = 2y$$

$$dz = \frac{\partial z}{\partial x} dx + \frac{\partial z}{\partial y} dy$$

$$dz = 10x \cdot dx + 2y dy$$

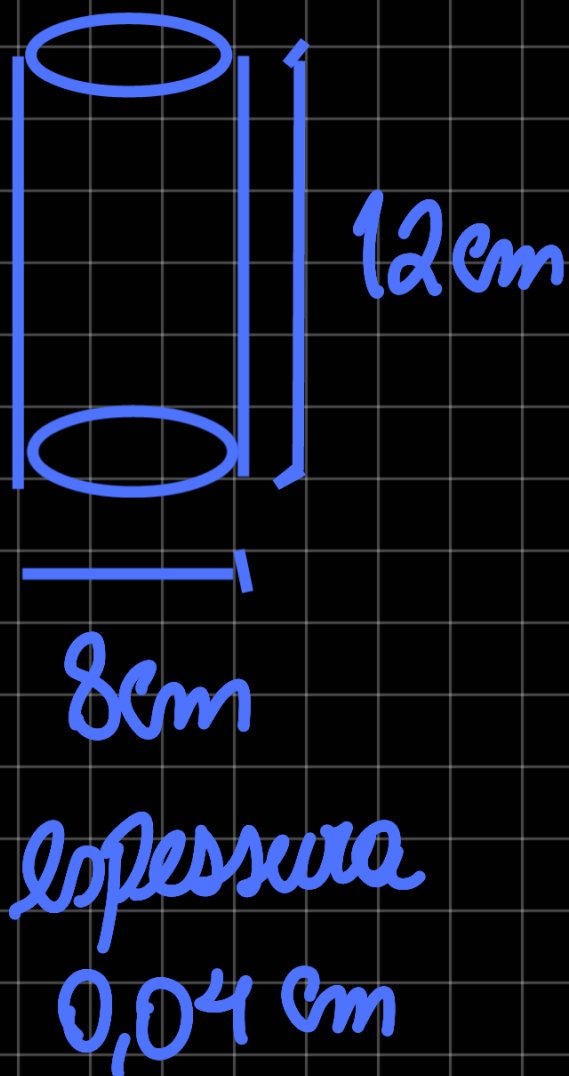
$$(1,2) \rightarrow 10 \cdot 1 \cdot 0,05 + 2 \cdot 2 \cdot 0,1 = 0,9$$

$$\Delta z = f(1,05, 2,1) - f(1,2) =$$

$$5(1,05)^2 + (2,1)^2 - 5 - 4 =$$

$$0,9225$$

35-



Volume do  
Cilindro:

$$V = \pi R^2 h$$

Como

$$\Delta V \approx dV$$

derivada em  $r$ :

$$dv = 2\pi r h dr$$

em  $h$ :  $dv = \pi r^2 dh$

$$dv = 2\pi r h dr + \pi r^2 dh$$

$$dr = 0,04 \text{ e } dh = 2 \cdot 0,04 = 0,08$$

logo:

$$dv = 2\pi \cdot 4 \cdot 12 \cdot 0,04 + \pi \cdot (4)^2 \cdot 0,08$$

$$dv = \underline{\underline{16,08 \text{ cm}^3}}$$

36-

$$W = 13,12 + 0,6215T - 11,37v^{16} \\ + 0,3965Tv^{0,16}$$

$$v = 26 \text{ km/h} \text{ e } dv = \pm 2 \text{ km/h}$$

$$T = 11^\circ\text{C} \text{ e } dT = \pm 1^\circ\text{C}$$

