

Corto #8 Cálculo Multivariable

Nombre: _____ Carnet: _____

1. Encuentre la ecuación del plano tangente a $z = 10 - \cos(\pi x^2) + 4(y^2 + 3)^{3/2}$ en el punto $(1, 1)$.

$$z = f(1,1) + f_x(1,1)(x-1) + f_y(1,1)(y-1)$$

$$f(1,1) = 10 - \cos(\pi) + 4 \cdot (2^2)^{3/2} = 10 + 1 + 4 \cdot 8 = 43.$$

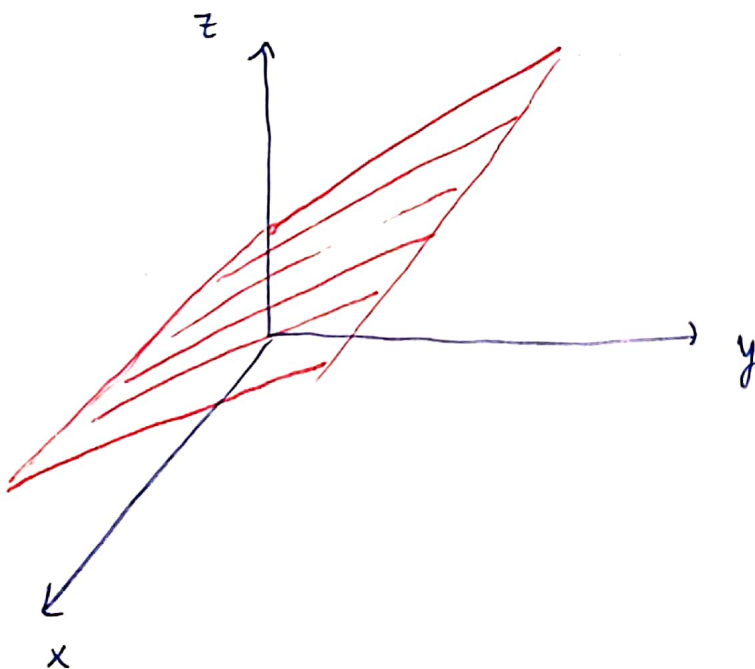
$$f_x = 0 + 2\pi x \sin(\pi x^2) + 0$$

$$f_x(1,1) = 2\pi \sin(\pi) = 0$$

$$f_y = 0 - 0 + 6(y^2 + 3)^{1/2} \cdot 2y.$$

$$f_y(1,1) = 6\sqrt{4} \cdot 2 = 24$$

Plano Tangente: $z = 43 + 24(y-1).$



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1. Encuentre las derivadas parciales de z en $\ln \sqrt{x^2 + y^2 + z^2 - 2} = 4xyz + 8$.

z - dependiente x, y independientes z_x, z_y .

$$\ln(x^2 + y^2 + z^2 - 2) - 4xyz = 8$$

$$F(x, y, z) = 8$$

$$\frac{\partial z}{\partial x} = - \frac{F_x}{F_z} = - \frac{\frac{x}{x^2 + y^2 + z^2 - 2} - 4yz}{\frac{z}{x^2 + y^2 + z^2 - 2} - 4xy}$$

$$= \frac{-x + 4yz(x^2 + y^2 + z^2 - 2)}{z - 4xy(x^2 + y^2 + z^2 - 2)} \quad \left. \vphantom{\frac{-x + 4yz(x^2 + y^2 + z^2 - 2)}{z - 4xy(x^2 + y^2 + z^2 - 2)}} \right\} + 5.$$

$$\frac{\partial z}{\partial y} = - \frac{F_y}{F_z} = - \frac{\left(\frac{y}{x^2 + y^2 + z^2 - 2} - 4xz \right)}{\frac{z}{x^2 + y^2 + z^2 - 2} - 4xy}$$

$$= \frac{-y + 4xz(x^2 + y^2 + z^2 - 2)}{z - 4xy(x^2 + y^2 + z^2 - 2)} \quad \left. \vphantom{\frac{-y + 4xz(x^2 + y^2 + z^2 - 2)}{z - 4xy(x^2 + y^2 + z^2 - 2)}} \right\} + 5.$$