① Vectores

$F_1 = e^x \cos(y) + yz + 3x + 2z^2$ $\quad$ $\nabla f_{(x,y)}$

$\quad F_{1y} = -e^x \text{sen}(y) + z$, $\quad f_{1z} = y + 4z$

$F_2 = kz - e^x \text{sen}(y) + \dfrac{x^3 y^2}{z}$

$\quad F_{2x} = z - \text{sen}(y)e^x + \dfrac{3xy^2}{z}$, $\quad f_{2z} = x + \dfrac{(-1)x^3 y^2}{z^2}$

$F_3 = ky + 7x$

$\quad F_{3y} = k$ $\qquad\qquad$ $f_{3x} = y + 7$

$$\nabla_x \vec{F} = \underset{R}{\underbrace{}} \begin{vmatrix} \hat{\imath} & \hat{\jmath} & \hat{k} \\ \dfrac{\partial}{\partial x} & \dfrac{\partial}{\partial y} & \dfrac{\partial}{\partial z} \\ F_1 & F_2 & F_3 \end{vmatrix}$$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad \therefore f$

$R =$

$$R = \left(\dfrac{\partial F_3}{\partial y} - \dfrac{\partial F_2}{\partial z}\right)\hat{\imath} + \left(\dfrac{\partial F_1}{\partial z} - \dfrac{\partial F_3}{\partial x}\right)\hat{\jmath} + \left(\dfrac{\partial F_2}{\partial x} - \dfrac{\partial F_1}{\partial y}\right)\hat{k}$$

$(3,2,4)$

$$R = x - \left(x - \dfrac{x^3 y^2}{z^2}\right)\hat{\imath} + \left(y + 4z - (y+4)\right)\hat{\jmath} + z - \text{sen}(y)e^x + 3x^2 - ($$

$$\underbrace{z - e^x \text{sen}(y))}_{3x^2}$$

$$R = 0.56 + 9 + 27$$

$$= 45.56$$

Problema 2

$$F = \frac{r}{16} - \frac{r^2}{160} \quad \rho^3 /_h$$

$$\int_{\theta}^{2\pi} \int_{4}^{5} \frac{r}{16} - \frac{r^2}{160} \, dr \, d\theta$$

$$\int_{4}^{5} \frac{r}{16} \, dr - \int_{4}^{5} \frac{r^2}{160} \, dr$$

$$\frac{1}{16} \left[\frac{r^2}{2} \right]_{4}^{5} - \frac{1}{160} \left[\frac{r^3}{3} \right]_{4}^{5}$$

$$\int_{0}^{2\pi} 0.15 \, d\theta$$

$$\left[0.15\theta \right]_{0}^{2\pi}$$

$$= \frac{37}{120} \pi$$

Pregunta 1

$$A_{(w,h)} = 0.0072 h^{0.725} \, w^{0.425}$$

$$A_w = 0.0072 h^{0.725} \times 0.425 \, w^{-0.575}$$

$$A_h = 0.0072 w^{0.425} \times h^{+0.275} \times 0.725$$

$h' = 20 \, cm/año$ \qquad $w' = 5 \, kg/año$

$$\frac{\partial A}{\partial t} = \frac{\partial A}{\partial w} \times \frac{\partial w}{\partial t} + \frac{\partial A}{\partial h} \times \frac{\partial h}{\partial t}$$

$h = 60 cm$
$w = 9 kg$

$$20 \times 0.0072 \times 0.425 \times (60)^{0.725} \times (9)^{-0.575} +$$

$$5 \times 0.0072 \times 0.725 \times (60)^{-0.275} \times (9)^{0.425}$$

$$\frac{\partial A}{\partial t} =$$