

Tarea 3: Criterio 2<sup>da</sup> Derivada

$$1.- \quad P(x, y) = 8x + 10y - (0.001)(x^2 + xy + y^2) - 10000$$

$$\frac{\partial P}{\partial x} = 8 - 0.002x - 0.001y$$

$$\frac{\partial P}{\partial y} = 10 - 0.002y - 0.001x$$

$$8 - 0.002x - 0.001y = 0 \quad | \quad 10 - 0.002y - 0.001x$$

$$\begin{array}{cc|c} -0.002 & -0.001 & -8 \\ -0.001 & -0.002 & -10 \end{array}$$

$$x = 2000, y = 4000$$

$$P(2000, 4000) = 18 \text{ mo}$$

$$(2000, 4000, 18000)$$

$$\frac{\partial^2 P}{\partial x^2} = -0.002$$

$P(2000, 4000)$  es máxima porque

$$\frac{\partial^2 P}{\partial y^2} = -0.002$$

$$P_{xy}(2000, 4000) = -0.002 < 0$$

$$\frac{\partial^2 P}{\partial x \partial y} = -0.001$$

$$D = \begin{bmatrix} -0.002 & -0.001 \\ -0.001 & -0.002 \end{bmatrix} \quad \begin{array}{l} -0.0004 \\ -0.0001 \end{array}$$

$$D > 0$$

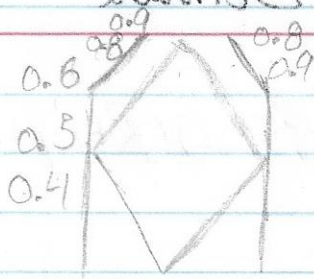
Señale.

1585.992 FS

obstáculo de 5 metros: 8 metros

2-

a)



b)  $\frac{\partial F}{\partial x} = y^2 - 2 \sin(2x)$

$$\frac{\partial F}{\partial y} = 2xy$$

$$y^2 - 2 \sin(2x) = 0 \quad | \quad 2xy = 0$$

$$x = 0$$

$$y = 0$$

c)  $F(0,0) = 1$

d)

$$\frac{\partial^2 F}{\partial x^2} = -4 \cos(2x)$$

$$\frac{\partial^2 F}{\partial y^2} = 2x$$

$$\frac{\partial^2 F}{\partial xy} = 2y$$

$$\frac{\partial^2 F}{\partial yx} = 2y$$

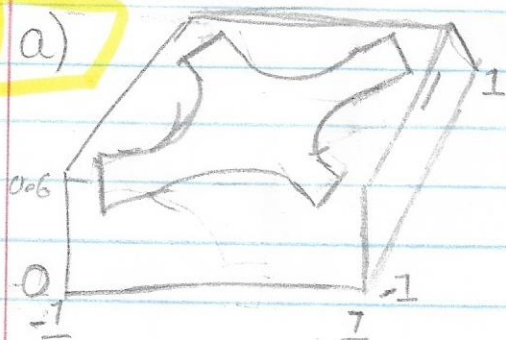
$$D \begin{bmatrix} -4 \cos(2x) & 2y \\ 2y & 2x \end{bmatrix} = -4$$

$$D = -4 < 0$$

$F(0,0)$  no es máximo ni mínimo

$$3) f(x,y) = x^2 y^2$$

a)



b)  $\frac{\partial f}{\partial x} = 2xy^2 \rightarrow x=0 \text{ o } y=0$

$\frac{\partial f}{\partial y} = 2x^2 y \rightarrow x=0 \text{ o } y=0$

c)  $f(0,0) = 0$

d)  $\frac{\partial^2 f}{\partial x^2} = 2y^2$

$\frac{\partial^2 f}{\partial y^2} = 2x^2$

$\frac{\partial^2 f}{\partial xy} = 4xy$

$$D \begin{bmatrix} 2y^2 & 4xy \\ 4xy & 2x^2 \end{bmatrix} = 0$$

$D=0$  por lo tanto el resultado es inconcluso