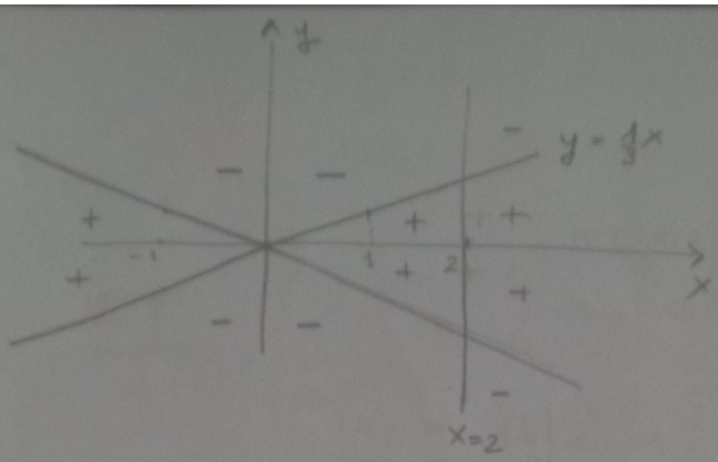

Se $y_0 > \frac{2}{3}$ $y_0 < -\frac{2}{3}$
$(2, y_0)$ pti di max

$(2, 2/3)$ e $(2, -2/3)$
sono pti di sella

Se $-2/3 < y_0 < 2/3$
$(2, y_0)$ pti di min

Es. 3* $\quad f(x,y) = 2yx^3 \quad$ vincolo $\quad y^2 + 4x^2 - 1 = 0$

$$\mathcal{L} = 2yx^3 - \lambda(y^2 + 4x^2 - 1)$$

$$\begin{cases} \dfrac{\partial \mathcal{L}}{\partial x} = 6yx^2 - 8\lambda x = 0 \\ \dfrac{\partial \mathcal{L}}{\partial y} = 2x^3 - 2\lambda y = 0 \\ \dfrac{\partial \mathcal{L}}{\partial \lambda} = y^2 + 4x^2 - 1 = 0 \end{cases} \qquad \begin{cases} 2x(3xy - 4\lambda) = 0 \\ 2(x^3 - \lambda y) = 0 \\ y^2 + 4x^2 - 1 = 0 \end{cases}$$

Se $\lambda = 0$
$x = 0$
$y^2 = 1 \Rightarrow y = \pm 1$
$A = (0, 1)$
$B = (0, -1)$

Se $\lambda \neq 0$

$$\lambda = \frac{3}{4}xy \qquad x^3 - \frac{3}{4}xy^2 = 0 \qquad x\left(x^2 - \frac{3}{4}y^2\right) = 0$$

$$x = \pm\sqrt{\frac{3}{4}}\,y \Rightarrow y^2 + 4\,\frac{3}{4}y^2 = 1 \qquad 4y^2 = 1 \qquad y = \pm\frac{1}{2}$$

$P_1\left(-\frac{\sqrt{3}}{4}, -\frac{1}{2}\right)$ $P_2\left(-\frac{\sqrt{3}}{4}, \frac{1}{2}\right)$ $P_3\left(\frac{\sqrt{3}}{4}, -\frac{1}{2}\right)$ $P_4\left(\frac{\sqrt{3}}{4}, \frac{1}{2}\right)$ $A = (0,1)$ $B = (0,-1)$

$$f\left(-\frac{\sqrt{3}}{4}, -\frac{1}{2}\right) = f\left(\frac{\sqrt{3}}{4}, \frac{1}{2}\right) = \cancel{2}\,\frac{1}{2}\left(\frac{\sqrt{3}}{4}\right)^3 \qquad f(0,1) = 0 = f(0,-1)$$

$$f\left(-\frac{\sqrt{3}}{4}, \frac{1}{2}\right) = f\left(\frac{\sqrt{3}}{4}, -\frac{1}{2}\right) = -2\,\frac{1}{2}\left(\frac{\sqrt{3}}{4}\right)^3$$

Il vincolo è un insieme chiuso e limitato

per il teorema di Weierstrass P_1 e P_4 sono di max
P_2 e P_3 " di min