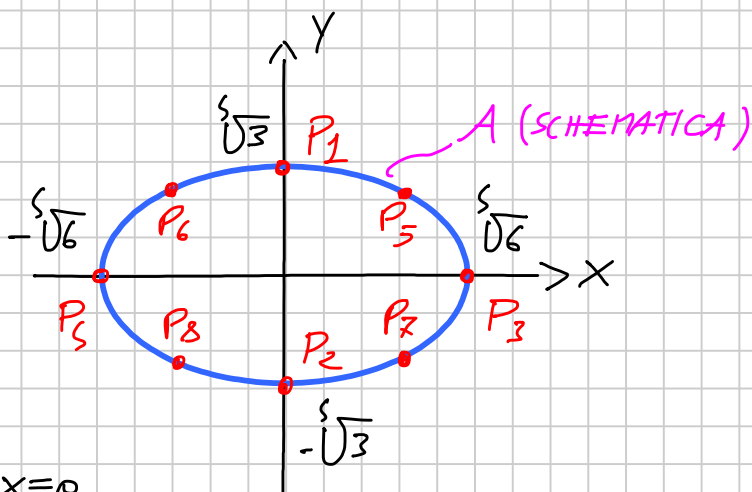


$$f(x, y) = 2^{x^2+y^2}$$

$$A: x^5 + 2y^5 = 6$$

$\left\{ \begin{array}{l} A \text{ COMPATTO} \leadsto \text{X.W.} \\ \text{MAX E MIN ESISTONO} \end{array} \right.$

$$\text{LAGRANGE: } \Phi(x, y) = x^5 + 2y^5 - 6 = 0$$



$$\text{SISTEMA 1} \left\{ \begin{array}{l} \Phi_x = 5x^4 = 0 \\ \Phi_y = 8y^4 = 0 \\ \Phi = 0 \end{array} \right. \left\{ \begin{array}{l} x=0 \\ y=0 \\ -6=0 \end{array} \right. \leadsto \text{IMPOSSIBILE}$$

$$\text{SISTEMA 2} \left\{ \begin{array}{l} f_x = 2x \cdot 2^{x^2+y^2} \ln 2 = 5x^4 \cdot 2 \\ f_y = 2y \cdot 2^{x^2+y^2} \ln 2 = 8y^4 \cdot 2 \\ \Phi = x^5 + 2y^5 - 6 = 0 \end{array} \right. \leadsto$$

$$\leadsto f_x \cdot 2y^5 = f_y \cdot x^5 \leadsto 2y^5 \cdot \cancel{2^{x^2+y^2} \ln 2} = x^5 \cdot \cancel{2^{x^2+y^2} \ln 2}$$

$$2xy^5 - x^5y = 0 \quad xy(2y^4 - x^4) = 0 \quad \left\{ \begin{array}{l} \text{A) } xy = 0 \\ \text{B) } 2y^4 - x^4 = 0 \\ \text{A) + B) } \end{array} \right.$$

$$\text{A) } xy = 0 \quad \left\{ \begin{array}{l} x=0 \leadsto P_{1,2} = (0, \pm\sqrt[5]{3}) \\ y=0 \leadsto P_{3,4} = (\pm\sqrt[5]{6}, 0) \\ x=y=0 \leadsto \emptyset \end{array} \right.$$

$$\text{B) } 2y^4 - x^4 = 0 \quad x^4 = 2y^4 \quad 5y^5 + 2y^5 = 6 \quad y^5 = 1 \quad y = \pm 1$$

$$\leadsto P_{5,6} = (\pm\sqrt[5]{2}, 1) \quad P_{7,8} = (\pm\sqrt[5]{2}, -1)$$

$$\text{A) + B) } \leadsto x=y=0 \leadsto \emptyset$$

$$\begin{cases} f(P_1) = f(P_2) = 2^{\sqrt{3}} \\ f(P_3) = f(P_5) = 2^{\sqrt{6}} \\ f(P_5) = f(P_6) = f(P_7) = f(P_8) = 2^3 = 8 > 2^{\sqrt{6}} \end{cases}$$

$$\rightarrow \begin{cases} \text{MAX} = 8 \text{ IN } P_5, P_6, P_7, P_8 \\ \text{MIN} = 2^{\sqrt{3}} \text{ IN } P_1 \text{ \& } P_2 \end{cases}$$