$\boxed{7.2}$ e) $f(x,y) = 3x^2 - y^2$ $\varepsilon = 0{,}01$

$$\frac{\partial^2 f}{\partial^2 x} = 6 \qquad \frac{\partial^2 f}{\partial^2 y} = -2 \qquad \frac{\partial^2 f}{\partial x \partial y} = \frac{\partial^2 f}{\partial x \partial y} = 0$$

$$\frac{\partial f}{\partial x} = 6x \qquad \frac{\partial f}{\partial y} = -2y$$

$$x = 5 \qquad y = -1$$

$$\begin{pmatrix} x_1 \\ y_1 \end{pmatrix} = \begin{pmatrix} x \\ y \end{pmatrix} - \varepsilon \cdot \begin{pmatrix} \frac{\partial^2 f}{\partial^2 x}(x,y) & \frac{\partial^2 f}{\partial x \partial y}(x,y) \\ \frac{\partial^2 f}{\partial x \partial y}(x,y) & \frac{\partial^2 f}{\partial^2 y}(x,y) \end{pmatrix} \cdot \begin{pmatrix} \frac{\partial f}{\partial x}(x,y) \\ \frac{\partial f}{\partial y}(x,y) \end{pmatrix}$$

$$\begin{pmatrix} x_1 \\ y_1 \end{pmatrix} = \begin{pmatrix} 5 \\ -1 \end{pmatrix} - 0{,}01 \cdot \begin{pmatrix} 6 & 0 \\ 0 & -2 \end{pmatrix} \cdot \begin{pmatrix} 30 \\ -2 \end{pmatrix}$$

$$\begin{pmatrix} x_1 \\ y_1 \end{pmatrix} = \begin{pmatrix} 5 \\ -1 \end{pmatrix} - 0{,}01 \cdot \begin{pmatrix} 180 \\ 4 \end{pmatrix} = \begin{pmatrix} 3{,}2 \\ -1{,}04 \end{pmatrix}$$

$$\begin{pmatrix} x_2 \\ y_2 \end{pmatrix} = \begin{pmatrix} 3{,}2 \\ -1{,}04 \end{pmatrix} - 0{,}01 \cdot \begin{pmatrix} 6 & 0 \\ 0 & -2 \end{pmatrix} \cdot \begin{pmatrix} 6 \cdot 3{,}2 \\ -2 \cdot (-1{,}04) \end{pmatrix} = \begin{pmatrix} 2{,}048 \\ -0{,}9984 \end{pmatrix}$$

following steps are analogue using Wolfram Alpha:

$$\begin{pmatrix} x_3 \\ y_3 \end{pmatrix} = \begin{pmatrix} 1{,}31072 \\ -0{,}958464 \end{pmatrix} \quad \begin{pmatrix} x_4 \\ y_4 \end{pmatrix} = \begin{pmatrix} 0{,}838861 \\ -0{,}920125 \end{pmatrix} \quad \begin{pmatrix} x_5 \\ y_5 \end{pmatrix} = \begin{pmatrix} 0{,}536871 \\ -0{,}88332 \end{pmatrix}$$

$$f(x_4, y_4) \approx 1{,}26 \qquad f(x_5, y_5) \approx 0{,}08$$