Q. 2. $x' = (2, 0)$

Putting $(2, 0)$ in the constraints.

$x_1^2 + x_2^2 - 9 \leq 0$

$-56 x_1 - x_2 + 6 \leq 0$

$4^0 - 9 \leq 0$

$-56 \times 2 + 6 \leq 0$

∴ ~~Both the constraints are active.~~

~~Both constraints are satisfied.~~

~~Say $(2, 0)$ is a KKT point.~~

None of the constraints are active as none of them are 0.

3. $\nabla f = \begin{bmatrix} 2(x_1 - 1) + x_2 & 2(x_2 + 56) + x_1 \end{bmatrix}$

H is +ve definite as shown before.

$\nabla f = 0$.

$\begin{cases} 2x_1 - 2 + x_2 = 0 \\ x_1 + 56 + 2x_2 = 0. \end{cases}$

$2x_1 + x_2 = 2$

$x_1 + 2x_2 = -56$

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$4x_1 + 2x_2 = 4$

$x_1 + 2x_2 = -56$

$3x_1 = 60$

(x_1, x_2)
$= (20, -38)$
is a global minima

$x_1 = 20$

$x_2 = -38$

Anuran Chakraborty