

$$f(x, y) = -2x^2 + 8x + 2y^2 + 4y - 9 \quad \{0 \leq x \leq 3, -1 \leq y \leq 3\}$$

$$\begin{cases} f_x = -4x + 8 = 0 \\ f_y = 4y + 4 = 0 \end{cases} \implies \begin{cases} x = 2 \\ y = -1 \end{cases}$$

Check bounds:

$$f(0, y) = 2y^2 + 4y - 9 \quad (\text{min})$$

$$f(2, y) = -8 + 16 + 2y^2 + 4y - 9 = 2y^2 + 4y - 1 \quad (\text{max})$$

$$f(3, y) = -18 + 24 + 2y^2 + 4y - 9 = 2y^2 + 4y - 3$$

$$f(x, -1) = -2x^2 + 8x + 2 - 4 - 9 = -2x^2 + 8x - 11 \quad (\text{min})$$

$$f(x, 3) = -2x^2 + 8x + 18 + 12 - 9 = -2x^2 + 8x + 21 \quad (\text{max})$$

Therefore,

$$f(2, 3) = 29 \quad (\text{absolute max})$$

$$f(0, -1) = -11 \quad (\text{absolute min})$$