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12.1 Section 4.7, Checkpoint 4.35

Use the second derivative to find the local extrema of the function

$$f(x, y) = x^3 + 2xy - 6x - 4y^2$$

12.2 Section 4.7, Checkpoint 4.36

Given $z = f(x, y)$ is continuous and differentiable on a closed, bounded set D, the strategy to find absolute extrema of f on D is to

1. Determine the critical points of f in D
2. Calculate f at each of these critical points
3. Determine the maximum and minimum values of f on the boundary of its domain
4. Find the absolute maximum and minimum values of f by comparing the values from steps 2 and 3.

Use the above strategy to find the absolute extrema of

$$f(x, y) = 4x^2 - 2xy + 6y^2 - 8x + 2y + 3 \text{ on } \{(x, y) : 0 \leq x \leq 2 \text{ and } -1 \leq y \leq 3\}$$