Problem 1

Find all local minima, maxima and saddle points of the of the function

$$f(x, y) = x^2 + 3x + 2y^2 + 2.$$

Problem 2

Find all local minima, maxima and saddle points of the of the function

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

Problem 3

Find all local minima, maxima and saddle points of the of the function

$$f(x, y) = x^3 + 3xy + y^3.$$

Problem 4

Find all local minima, maxima and saddle points of the of the function

$$f(x, y) = x^4 + 4xy + y^4.$$

Problem 5

Find the absolute maxima of the function from problem 1 over the region $-2 \leq x \leq 1$ and $-1 \leq y \leq 1$.