Worksheet 10

1. Find the absolute minimum and the absolute maximum of the function

$$f(x, y) = 2x^2 + x + 2y^2 - 2$$

on the domain $\Omega = \{(x, y) : x^2 + y^2 \leq 1\}$.

2. Find and classify all the critical points of the function

$$f(x, y) = (x^2 + y^2)e^{-x}.$$

3. Find all the critical points of the function

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

4. Find and classify all the critical points of the function

$$f(x, y) = \ln x + 2 \ln y - x - 4y.$$

5. Find the absolute minimum and the absolute maximum of the function

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

on the domain $D = \{(x, y) : x, y \geq 0; \; x + y \leq 1\}$.