

Mathematical analysis II — Tutorial 10

<http://kam.mff.cuni.cz/~tereza/teaching.html>

Problem 1: Find points where the functions can have extremes. You don't have to verify these points are extremes, but think about how would you proceed.

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

b) $f(x, y) = \sin(x^2 + y) + y$

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

d) $f(x, y) = a \ln y - by + c \ln x - dx \quad a, b, c, d \in \mathbb{R}$

e) $f(x, y) = |x| + |y|$

Problem 2: Find local extremes:

a) $f(x, y) = x^3/3 - x - (y^3/3 - y)$

b) $f(x, y, z) = x + \frac{y^2}{4x} + \frac{z^2}{y} + \frac{2}{z}$

Problem 3: Find global extremes:

a) $f(x, y) = 2x^2 - x^3 - y^2, \quad x, y \geq -1$

b) $f(x, y) = x^2 + 4y^4 - 2x^2y + 4, \quad x, y \in [-1, 1]$

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