

Home Assignment 2 - Multivariable calculus, 2010.

Deadline: 07.10.2010.

1. Find the maximum and minimum values of the function

$$f(x, y) = 2x + 3y - \sqrt{8 - 2x^2 - y^2}. \quad (1/4 \text{ p})$$

2. Find the points on the curve $x^4 + x^2y^2 + 2y^4 = 1$ that are closest to and farthest from the origin. (1/4 p)

3. A wire of length a is cut into three pieces that are bent to form a circle, a square, and an equilateral triangle. How should the cuts be made in order to *minimize* the sum of the areas of the three objects ? (1/2 p)

4. Calculate $\iint_{\Delta} \frac{x+y}{1+(x-y)^2} dx dy$,

where Δ is a triangle with vertices at $(0, 0)$, $(1, 0)$ and $(0, 1)$. (1/2 p)

5. Calculate $\iint_{\mathbb{R}^2} (x^2 + y^2) e^{-x^2 - 4y^2} dx dy$. (1/2 p)