Midterm

Students have 60 minutes and can use any literature (notes, tables, textbooks...), but no technical devices (phone, calculator, watches...).

1. (7 points)

    Show that
    $$\arcsin(x + y) + \arctan(x + y) + xy = 0$$

    determines at some neighborhood of the point $[0, 0]$ implicitly given function with variable x. Compute the first derivative of this function at the point $[0, 0]$.

2. (8 points)

    Find global maximum and minimum of the function f on the set M.

    $$f(x, y) = -y^2 + x^2 + \frac{4}{3}x^3, \qquad M = \mathrm{bd}\{[x, y] \in \mathbb{R}^2; x^2 + y^2 \leq 4, x \leq 0\}.$$

3. (5 points) Approximate the value of $1,04^{2,02}$.