01 Exam

Students have 120 minutes and can use any literature (notes, tables, textbooks. . .), but no technical devices (phone, calculator, watches. . .).

Good luck!

Example of the written part

1. (7 points) Compute the determinant of the following matrix

$$\begin{pmatrix} -1 & 2 & 0 & -3 \\ 4 & 0 & -1 & -1 \\ 2 & 0 & 3 & 1 \\ -2 & -1 & 1 & 0 \end{pmatrix}$$

2. (9 points) Show that

$$e^{xy} - \cos(x + y) + \sin(3x - y) = 0$$

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 $[0, 0]$.

3. (9 points) Find global maximum and minimum of the function f on the set M.

$$f(x, y) = x^2 y + 8y, \qquad M = \{[x, y] \in \mathbb{R}^2; x^2 + 9y^2 \leq 1\}.$$