MATHEMATICS 2

Exam

12/09/2019, A.Y. 2018/2019

WARNING! Examiners are allowed to collect only THIS A3 paper, any other additional papers (drafts, notes, scribbles or anything else) will not be taken into consideration. Use a clear and clean handwriting. Unclear or ambiguous sentences may result in a negative impact on the final grade of the exam.
PENALTIES: Each examiner can, UNQUESTIONABLY, assign a penalty if he considers that two participants have communicated with each other (in any way). One penalty does not imply anything for the valuation of the exam. However, should an attendee be given two penalties, it will be immediately expelled from the exam session and her/his exam will be invalidated.
SUGGESTION: Remember to always double check the consistency of your results. Inconsistent statements may result in a negative impact on the final grade of the exam.

MATRICOLA ..... Lastname ..... Name .....

1) *(8 p.ts)* Solve the following integral

$$\int \frac{\cos(3\log x)}{x} dx$$

2) *(10 p.ts)* Find eigenvalues and eigenvectors of the following matrix and determine if it is diagonalizable? If so, identify the invertible matrix T that transforms A into a diagonal matrix, and show how T realizes this transformation.

$$A = \begin{pmatrix} 2 & -1 & -1 \\ 0 & -2 & 0 \\ 0 & 0 & -2 \end{pmatrix}$$

3) *(12 p.ts)* Find max/min of the following function

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

subject to the following constraint

$$x^2 + y^2 - 4 = 0$$