Università Ca' Foscari di Venezia - Dipartimento di Economia - A.A.2016-2017
Mathematics 2 (Curriculum Economics, Markets and Finance)

Partial Examination - A - Prof. Luciano Battaia

2016/21/12

Surname: | | | | | | | | | | | | | | | | |

Name: | | | | | | | | | | | | | | | | |

Matriculation Number: | | | | | | |

Legible student's signature: ______________________________

Instructions.

1. Use of programmable or graphing calculators is not allowed.
2. Exchanging information or communication with other people, as well as any other form of cheating, implies the immediate disqualification of your exam.
3. Points for correct exercise: 6 points (exercise 1), 5 points (exercise 2 and 3). You are asked to *justify* your answers.
4. Please give back *only* these sheets to the instructor: all needed calculations and explanations must be written on these sheets.

Grade (reserved to teacher)

Ex.1	
Ex.2	
Ex.3	

Exercise 1. *Consider the vectors*

$$\vec{v}_1 = \begin{pmatrix} 1 \\ 2 \\ -1 \end{pmatrix}, \quad \vec{v}_2 = \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix}, \quad \vec{v}_3 = \begin{pmatrix} 0 \\ 4 \\ k \end{pmatrix},$$

where k is a real number.

a) *Find for which values of k the vectors are linearly independent.*
b) *Set $k = -3$. Write $\vec{v}_3$ as a linear combination of the others.*
c) *Set $k = 1$. Find the inverse of the matrix whose columns are the given vectors and check that the product of the matrix by its inverse is the identity matrix.*

Exercise 2. *Consider the two variables real function*

$$f(x,y) = x^2 + y^3 - 4x - 12y + 1.$$

a) *Find all local maximum, minimum and saddle points. In case of maxima or minima find also the corresponding values of the function.*
b) *Consider the constraint $y = x$. Find all local maximum and minimum points of the function f on this constraint, without the use of Lagrangian multipliers. Say whether the function has global maximum or minimum on the constraint.*

Exercise 3. *Consider the two variables real function*

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

and the constraint $g(x,y) = x^2 + 4y^2 - 1 = 0$. *Suppose you know that the constraint is an ellipse (so it is closed and bounded).*

Find the global maximum and minimum of the function on the constraint using the Lagrangian multipliers method.