Università Ca' Foscari di Venezia - Dipartimento di Economia - A.A.2016-2017
Mathematics -1 (Curriculum Economics, Markets and Finance)

Partial Examination - B - Prof. Luciano Battaia

2016/03/11

Surname: _____ Name: _____

Matriculation Number: | | | | | | |

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 (exercises 2 and 3). You are asked to justify your answers.

Grade (reserved to teacher)

Ex.1	
Ex.2	
Ex.3	

Exercise 1. *Given the function*

$$f(x)=\begin{cases} \mathrm{e}^x+a, & \text{if } x<0 \\ -3x^2+x+2, & \text{if } 0\le x\le 1 \\ \ln(3x-2)+b, & \text{if } x>1 \end{cases},$$

a) *find a and b so that that the function is continuous everywhere;*
b) *say whether the obtained function is differentiable at $x=0$;*
c) *say whether the obtained function is differentiable at $x=1$;*
d) *compute*

$$\int_{-1}^{1} f(x)\,\mathrm{d}x.$$

Exercise 2. *Given the function*

$$f(x) = 3x^2 - 8\,,$$

a) *find its antiderivative, say* $F(x)$*, for which* $F(0) = -3$*;*
b) *compute the local maximum and minimum points of* $F(x)$*;*
c) *say whether* F *has global maximum and/or minimum;*
d) *compute the inflection points of* F*.*

Exercise 3. *Given the function*

$$f(x) = \begin{cases} \ln(x) + 1, & \text{if } x > 1 \\ ax^3 + bx + 1, & \text{if } x \leq 1 \end{cases},$$

a) *find a and b such that f is everywhere continuous and differentiable;*
b) *find the limits*

$$\lim_{x \to +\infty} f(x) \quad , \quad \lim_{x \to -\infty} f(x);$$

c) *consider the function only in the interval $[-1, 1]$ and find its global maximum and minimum.*