Università Ca' Foscari di Venezia - Dipartimento di Economia - A.A.2016-2017

Mathematics (Curriculum Economics, Markets and Finance)

Mockup of Partial Examination - 1.3

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Exercise 1. *Given the function*

$$f(x)=\begin{cases} 4\sqrt{x}, & \text{if } x\geq 1 \\ x^2+ax, & \text{if } x<1 \end{cases},$$

a) find the value of $a\in\mathbb{R}$ for which the function is continuous in all its domain;
b) say whether the obtained function is differentiable or not;
c) plot an approximate graph of the function;
d) find the area of the limited region of the plane between the function, the x axis and the lines $x=0$ and $x=2$.

Exercise 2. *Given the function*

$$f(x)=\frac{\ln(25-x^2)}{\sqrt{4-x^2}},$$

a) find its natural domain;
b) determine the tangent line to its graph about the point $x=0$.

Exercise 3. *Given the function*

$$f(x)=12x^3-12x^2,$$

a) find its antiderivative, say $F(x)$, for which $F(0)=1$;
b) compute the local maximum and minimum points of $F(x)$;
c) say whether F has maximum and/or minimum;
d) compute the inflection points of F.