CODE 1: MID-TH1-1819

FACULTY OF INFORMATION TECHNOLOGY
DEPARTMENT OF MATHEMATICS
School year 2018-2019

SOCIAL REPUBLIC OF VIETNAM
Independence - Freedom - Happiness
September 25, 2018

MIDTERM EXAM

Times: 50 minutes

THE01001. CALCULUS 1

Description of the test : this test includes 5 exercises with 8 questions. Points are distributed as follows:

Question	1	2	3	4	5	6	7	8
Points	1.0	1.0	1.5	1.5	1.5	1.0	1.5	1

Exercise 1. 2.0 pt Evaluate the following limits

a) 1.0 pt $\lim_{t\to 3} \dfrac{x^2-2x-3}{x-3}$.

b) 1.0 pt $\lim_{t\to +\infty} \dfrac{\ln x}{\sqrt{x}}$.

Exercise 2. 1.5 pt At which point is the function

$$f(x) = \frac{1}{(2x-1)}.$$

discontinuous? Can the discontinuity be removed?

Exercise 3. 1.5 pt Find the derivative of the following function

$$y = x^2 \ln(2x+1).$$

Exercise 4. 1.5 pt Suppose that a bacteria colony grows in such a way that at time t the population size is

$$N(t) = N(0)2^t,$$

where $N(0)$ is the population at time 0. Find the per capita growth rate.

Exercise 5. 3.5 pt Suppose that the size of a population at time t is $N(t)$ and its growth rate is given by the logistic function

$$\frac{dN}{dt} = 2N(1-\frac{N}{100}), t \geq 0.$$

a) 1.0 pt Graph the growth rate as a function of N.

b) 1.5 pt Find the population size for which the growth rate is maximal.

c) 1.0 pt Identify all equilibria (i.e. all points where $\dfrac{dN}{dt} = 0$).

LECTURER
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