# Correctional.Test.2. 14.Dec.11. Name: Neptun:

I.

1. Compute the derivatives of the following functions!

- $\sqrt[5]{x^6} - \frac{1}{\sqrt[6]{(3x)^5}} + \sin{(3x-1)}$

- $\sin x \ln{(-x-1)}$

- $\frac{\sin{(2x)}}{x^{-2}-1}$

2. Compute the $\int f(x)\,dx$ indefinite integrals of the following $f(x)$ functions!

- $\cos{(-x)} + \sin(3x)$

- $(3x)^{-2} - 2x - 1$

II.

1. Compute the $\int x \sin{(-3x)}\,dx$ !
2. Find the local extremal values of the following function: $f(x) = -x^3 - x^2$ !

III.

Solve the following differential equations!

- 
$$y' = 13, \quad y(1) = 13,$$

- 
$$y' = \sin(2x), \quad y(2) = 13,$$

- 
$$y' = 1 - 2y, \quad y(2) = 3,$$

IV.

- Plot the solution set of the following differential equation! Find the equilibrium positions and determine their stability!

$$y' = y^2 - 9.$$

- There are 8 black and 5 white balls in a box. Suppose that we DO NOT put back the balls after the drawings. What is the chance of drawing firstly 2 white and then 3 black balls? What is the chance of drawing 2 white and then 3 black balls if the order is irrelevant?

- A firm undertakes two projects, $A$ and $B$. The probabilities of having successful outcomes are $\frac{1}{4}$ for project A and $\frac{1}{3}$ for project $B$. The probability that both projects will have a successful outcome is $\frac{1}{12}$. Are the two outcomes independent?