A3 examination test, 2020. Jan. 07.

1	2	3	4	5	6	7	8	9	$\sum$	test1	test2	$\sum\sum$	grade

Name: **Neptun-code:**

1. Solve the following differential equation: $y' = 2y - x + 4$.

2. Solve the following differential equation: $e^y dx + (xe^y + 2y)dy = 0$.

3. Solve the following differential equation: $y'' + y = e^x \sin x$.

4. Five people, A, B, C, D, E, sit down on a bench in a random order. What is the probability that A is sitting left to B and B is sitting left to C?

5. We flip a coin 3 times. Provided that there is a head among the results what is the probability that there is a tail among the results?

6. A certain tax authority investigates 5% of the firms every year. What is the probability that a certain firm is investigated during a 5 year period

   a) at least once?

   b) at leat twice?

7. The nicotine level of smokers follows normal distribution with expectation 315 and variance 17 161.

   (a) What is the probability that the nicotine level of a random smoker falls between 150 and 400?

   (b) Above what nicotine level are the 5% of the smokers ?

8. Solve the following system of differential equations:

$$x' + 2x = -2y, \ \ 2x' = -y' - 2y.$$

9. A firm producing a certain kind of equipment claims that 2% of the equipments are defective. What is the approximate probability that in a shipment of 500 equipments at least 15 will be defective, provided that the firm's claim is true?