

EXAM 2 – Retake (duration: 25 minutes)

DatZ1143: Discrete mathematics for computing

Instructor: Abuzer Yakaryılmaz

Name and surname:

Student number:

Date:

Questions

(There are 4 questions with total 10 points.)

1. Let $P(x)$ denote the statement “ $1 - x^2 > x$ ”, where x is an integer.

1.a. Please give an example of x such that $P(x)$ is true [1 point]

1.b. Please give an example of x such that $P(x)$ is false [1 point]

2. Determine the truth value of each of these statements if the domain of each variable consists of all real numbers. Please write your answer after each statement [0.5 point each, 2 points in total]

- $\forall x(\sqrt{x} \geq 0)$
- $\exists y(y^2 + 2 \leq 2)$
- $\exists z(z^2 + 1 = 0)$
- $\forall t(t^3 \neq -t)$

3. Please give a counter example to show that the statement

$$\forall x \forall y ((x - 1)^2 + (y - 2)^2 > 0)$$

is false, where x and y are integers [1 point]

4. Prove that the compound proposition $p \rightarrow (p \vee q)$ is a tautology. [5 points]