EXAM 4 (duration: 25 minutes)

DatZ1143: Discrete mathematics for computing
Instructor: Abuzer Yakaryılmaz

Name and surname:

Student number:

Date:

Questions

(There are 10 questions. Each is 1 point. Total is 10 points.)

1. Let $f(x) = 2x + 2$ and $g(x) = 3x + 3$ be two functions from integers to integers. Calculate the value of $(f \circ g)(-1)$.

2. Let $f(x) = 2x + 2$ and $g(x) = 3x + 3$ be two functions from integers to integers. Calculate the value of $(g \circ f)(-1)$.

3. Is $f(n) = \pm n$ a function from $\mathbb{Z}$ to $\mathbb{R}$?

4. Is $g(n) = \sqrt{n^2 + 1}$ a function from $\mathbb{Z}$ to $\mathbb{R}$?

5. Is $h(n) = \frac{1}{n^2-4}$ a function from $\mathbb{Z}$ to $\mathbb{R}$?

6. Let $f(a) = \lceil \frac{a}{3} \rceil$ be a function from integers to integers.
Calculate the value of $f(-2) + f(-1) + f(0) + f(1) + f(2)$.

7. Let $g(a) = \lfloor \frac{a}{3} \rfloor$ be a function from integers to integers.
Calculate the value of $g(-2) + g(-1) + g(0) + g(1) + g(2)$.

8. Is function $t(x) = 2x - 1$ from integers to integers one-to-one or not? If it is not one-to-one, explain your answer with an example.

9. Is function $t(x) = 2x - 1$ from integers to integers onto or not? If it is not onto, explain your answer with an example.

10. Is function $t(x) = 2x - 1$ from integers to integers invertible? If it is not invertible, then explain why. If it is invertible, then, what is $f^{-1}(x)$?