University of Primorska, FAMNIT
academic year 2026/2027

**Analysis I**
1st quiz - MA
22 October 2026

Name and Surname :

Student Number :

Program :

*• All unauthorized materials (textbooks, calculators, electronic devices, etc.) are not permitted to have them during the examination.*
*• ANY form of communication with fellow students during the exam will not be accepted. Students involved will immediately be expelled from the classroom.*
*• If you leave the classroom after the exam has started then you are not allowed back in.*
*• Do all the computations fully. Also, whenever the answer is a ratio, simplify it as much as possible.*
*• In your solutions, explain the arguments leading to the answer in a clear, organized fashion. You might get no points for correct answers with no explanation and/or unorganized solution.*

***Write your solutions clearly and justify each answer.***

*Duration:* 20 *minutes. There are* 2 *problems worth a total of* 100 *points.*

*Good luck!*

1. *(40 points)* Describe $2+\sqrt{5}$ as a Dedekind cut of $\mathbb{Q}^{\geq 0}$ without explicitly referring to any irrational number in the definition of the cut. Justify your answer.

2. *(60 points)* Let $a$ be a nonzero integer. Prove by mathematical induction that

$$(1+a)^n - 1 - an$$

is divisible by $a^2$ for every $n \in \mathbb{N}$.