University of Primorska, FAMNIT
academic year 2026/2027

Analysis I
1st quiz - MR
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)* Prove by mathematical induction that $17^n - 3^n$ is divisible by 7 for every $n \in \mathbb{N}$.

2. *(60 points)* Consider the set

$$A = \{q \in \mathbb{Q}^{\geq 0} : q < 3 \text{ and } (3-q)^2 > 5\}.$$

(a) Show that A is nonempty and bounded above.

(b) Show that A is a Dedekind cut of $\mathbb{Q}^{\geq 0}$.

(c) Determine $\inf(A)$ and $\sup(A)$ in $\mathbb{R}$. Justify your answer.