

Family name: First name: student's ID:

A*	1	2	3	4	5	Σ

Problems:

1	<p style="text-align: center;">Evaluate the limit</p> $\lim_{n \rightarrow \infty} \sqrt[2n]{2^n + 3^n + 4^n}.$
2	<p>For what values of parameters a and b the function</p> $g(x) = \begin{cases} \frac{a^x - 1}{x}, & x < 0 \vee x \geq 1 \\ ax^2 + bx - 1, & x \in [0, 1) \end{cases}$ <p style="text-align: right;">is continuous?</p>
3	<p>What are the maximal and minimal values of the function</p> $f(x) = \frac{x^2 + x + 1}{x^2 - x + 1}?$
4	<p style="text-align: center;">Evaluate the integral</p> $\int_0^1 \frac{\tan^{-1} t}{1 + t^2} dt.$
5	<p style="text-align: center;">Determine whether the series</p> $\sum_{n=2}^{+\infty} \frac{1}{n \cdot \ln n}$ <p style="text-align: center;">converges or diverges.</p>