

15. minitest MAT2

Varianta B

16. 4. 2025

Vypočítejte limitu posloupnosti

$$\lim_{n \rightarrow \infty} \frac{2^{4n-3} + 8^{\frac{4n+1}{3}} - 27^{\frac{2n}{3}}}{2^{4n+3} + 8^{\frac{4n-1}{3}} + 27^{\frac{2n}{3}}}$$

$$\begin{aligned}
 &= \lim_{n \rightarrow \infty} \frac{2^{-3} \cdot 16^n + 2 \cdot 16^n - 9^n}{2^3 \cdot 16^n + 2 \cdot 16^n + 9^n} = \lim_{n \rightarrow \infty} \frac{16^n \cdot \left(\frac{1}{8} + 2 - \frac{9^n}{16^n} \right)}{16^n \cdot \left(8 + \frac{1}{2} + \frac{9^n}{16^n} \right)} \\
 &= \frac{\frac{1}{8} + 2 - 0}{8 + \frac{1}{2} + 0} = \frac{\frac{1+16}{8}}{\frac{16+1}{2}} = \frac{17}{8} \cdot \frac{2}{17} = \frac{1}{4}
 \end{aligned}$$

$\nearrow 0$
 $\downarrow 0$

15. minitest - Varianta A, fondeli 14.4.

$$\lim_{n \rightarrow \infty} \frac{4^{2n+1} - 2^{4n-1} + 8^{\frac{4n}{3}} - 100^{\frac{n}{2}}}{4^{2n-1} + 2^{4n+1} + 8^{\frac{4n}{3}} + 100^{\frac{n}{2}}} =$$

$$= \lim_{n \rightarrow \infty} \frac{4 \cdot 16^n - \frac{1}{2} \cdot 16^n + 16 - 10^n}{\frac{1}{4} \cdot 16^n + 2 \cdot 16^n + 16^n + 10^n} =$$

$$= \lim_{n \rightarrow \infty} \frac{16^n \left(4 - \frac{1}{2} + 1 - \left(\frac{10}{16} \right)^n \right)}{16^n \left(\frac{1}{4} + 2 + 1 + \left(\frac{10}{16} \right)^n \right)} \rightarrow 0$$

$$= \frac{4 - \frac{1}{2} + 1 - 0}{\frac{1}{4} + 2 + 1 + 0} = \frac{\frac{9}{2}}{\frac{13}{4}} = \frac{9}{2} \cdot \frac{4}{13} = \underline{\underline{\frac{18}{13}}}$$