

3. minitest - Matematika C1, pondělí 14.4.2025

$$a) \lim_{x \rightarrow 1} \frac{x^3 - 4x^2 + 3}{x^2 + 6x - 7} = \lim_{x \rightarrow 1} \frac{(x-1)(x^2 - 3x - 3)}{(x-1)(x+7)} = \frac{1^2 - 3 \cdot 1 - 3}{1+7} = \underline{\underline{-\frac{5}{8}}}$$

$$\begin{array}{r} (x^3 - 4x^2 + 3) : (x-1) = x^2 + 3x - 3 \\ - (x^3 - x^2) \\ \hline -3x^2 + 3 \\ - (-3x^2 + 3x) \\ \hline -3x + 3 \\ - (-3x + 3) \\ \hline 0 \end{array}$$

$$b) \lim_{x \rightarrow +\infty} \frac{2^x + 3^x - 3^x - 1}{2^x + 3^x + 3^x + 1} = \lim_{x \rightarrow +\infty} \frac{3^x \cdot \left(\frac{2}{3}\right)^x + 1 - \frac{1}{3}}{3^x \cdot \left(\frac{2}{3}\right)^x + 1 + 3}$$

$\begin{array}{c} \rightarrow 0 \\ \downarrow 0 \end{array}$

$$= \frac{0 + 1 - \frac{1}{3}}{0 + 1 + 3} = \frac{\frac{2}{3}}{4} = \frac{2}{3} \cdot \frac{1}{4} = \underline{\underline{\frac{1}{6}}}$$

3. minitest

Matematika C1, LS 2024/25

15. 4. 2025

Vypočtěte limity bez použití L'Hospitalova pravidla.

a) $\lim_{x \rightarrow 1} \frac{x^3 + 4x - 5}{x^2 + 4x - 5}$

b) $\lim_{x \rightarrow \infty} \frac{3^x + 4^x - 2^{2x-1}}{3^x + 4^x - 2^{2x+1}}$

a) $\lim_{x \rightarrow 1} \frac{x^3 + 4x - 5}{x^2 + 4x - 5} = \lim_{x \rightarrow 1} \frac{(x-1)(x^2+x+5)}{(x-1)(x+5)} = \frac{1+6}{1+5}$

$$\begin{array}{r} (x^3 + 4x - 5) : (x-1) = x^2 + x + 5 \\ - (x^3 - x^2) \\ \hline x^2 + 4x - 5 \\ - (x^2 - x) \\ \hline 5x - 5 \\ - (5x - 5) \\ \hline 0 \end{array}$$

b) $\lim_{x \rightarrow \infty} \frac{3^x + 4^x - 2^{-1} \cdot 4^x}{3^x + 4^x - 2^1 \cdot 4^x} = \lim_{x \rightarrow \infty} \frac{4^x \cdot \left(\left(\frac{3}{4}\right)^x + 1 - \frac{1}{2}\right)}{4^x \cdot \left(\left(\frac{3}{4}\right)^x + 1 - 2\right)}$

$$= \frac{0 + 1 - \frac{1}{2}}{0 + 1 - 2} = \frac{\frac{1}{2}}{(-1)} = \underline{\underline{-\frac{1}{2}}}$$