

9. Cvičení z MA I. (30.11.06)

1. Spočítejte následující limity:

- (a) $\lim_{x \rightarrow 0} \frac{\cos x + 1}{\cos x - 1} \quad [-\infty]$ (b) $\lim_{x \rightarrow +\infty} \sin \left(\pi \cdot \frac{4\sqrt{x} - 3\sqrt[3]{x}}{2\sqrt[4]{x^2 + 1}} \right) \quad [0]$
(c) $\lim_{x \rightarrow 0} \frac{\operatorname{tg}(x^2)}{x \cdot \sin 3x} \quad [\frac{1}{3}]$ (d) $\lim_{x \rightarrow 0} \frac{4^{3x} - 1}{\ln(x+1)} \quad [3 \ln 4]$

2. Spočítejte následující limity:

- (a) $\lim_{x \rightarrow -\infty} \operatorname{tg} \left(\frac{\pi}{4} x \cdot (\sqrt{x^2 + 1} - \sqrt{x^2 - 1}) \right) \quad [-1]$ (b) $\lim_{x \rightarrow 0} \frac{\sin x + 1}{\sin x} \quad [neex.]$
(c) $\lim_{x \rightarrow 16} \sqrt{\frac{4 - \sqrt{x}}{64 - \sqrt{x^3}}} \quad [\frac{1}{4\sqrt{3}}]$ (d) $\lim_{x \rightarrow 0} e^{\frac{\sqrt[3]{1-x^2} - 1}{5x^2}} \quad [e^{-\frac{1}{15}}]$
(e) $\lim_{x \rightarrow -\infty} \frac{\ln(1+e^x)}{x} \quad [0]$ (f) $\lim_{x \rightarrow +\infty} \sqrt{\frac{\cos x + 2}{x^2 + x}} \quad [0]$
(g) $\lim_{x \rightarrow +\infty} x \left(2^{\frac{1}{x}} - 1 \right) \quad [\ln 2]$ (h) $\lim_{x \rightarrow 0} \frac{\ln(1+x^2)}{\ln(1-x^2)} \quad [-1]$
(i) $\lim_{x \rightarrow 3} \frac{\arcsin(x-3)}{x^2 - 3x} \quad [\frac{1}{3}]$ (j) $\lim_{x \rightarrow -\infty} \frac{\operatorname{arccotg} x}{x} \quad [0]$
(k) $\lim_{x \rightarrow 2} \left(\operatorname{arctg} \left(\frac{1}{2-x} \right) \right)^2 \quad [\frac{\pi^2}{4}]$ (l) $\lim_{x \rightarrow +\infty} \left(\frac{3x+2}{2x+3} \right)^{2x-1} \quad [+ \infty]$
(m) $\lim_{x \rightarrow +\infty} \left(\frac{x^2+3}{x^2+7} \right)^x \quad [1]$ (n) $\lim_{x \rightarrow 0} \frac{1-4^x}{\sin 2x} \quad [-\ln 2]$
(o) $\lim_{x \rightarrow 0} \left(\frac{2^x + 8^x}{2} \right)^{\frac{1}{x}} \quad [4]$