Limity v nevlastním bodě I

1. $\lim\limits_{x\to\infty} \dfrac{x^2-1}{x-1}$

2. $\lim\limits_{x\to\infty} \dfrac{x^2-4}{x^2-3x+2}$

3. $\lim\limits_{x\to\infty} \dfrac{x-3x^2}{x-4x^2}$

4. $\lim\limits_{x\to\infty} \left(\dfrac{x}{1+x}-\dfrac{x}{1-x}\right)$

5. $\lim\limits_{x\to\infty} \left(\dfrac{x^2}{1+x}-\dfrac{x^2}{1-x}\right)$

6. $\lim\limits_{x\to-\infty} \dfrac{x^2-2x+5}{2x^3-x^2+4}$

7. $\lim\limits_{x\to\infty} \dfrac{\sqrt{x}-6x}{3x+1}$

1. $\lim\limits_{x\to\infty}\dfrac{x^2-1}{x-1}=\lim\limits_{x\to\infty}\dfrac{x-\frac{1}{x}}{1-\frac{1}{x}}=\dfrac{\lim\limits_{x\to\infty}x-\lim\limits_{x\to\infty}\frac{1}{x}}{\lim\limits_{x\to\infty}1-\lim\limits_{x\to\infty}\frac{1}{x}}=\dfrac{\infty-0}{1-0}=\infty$

2. $\lim\limits_{x\to\infty}\dfrac{x^2-4}{x^2-3x+2}=\lim\limits_{x\to\infty}\dfrac{1-\frac{4}{x^2}}{1-\frac{3}{x}+\frac{2}{x^2}}=\dfrac{\lim\limits_{x\to\infty}1-\lim\limits_{x\to\infty}\frac{4}{x^2}}{\lim\limits_{x\to\infty}1-\lim\limits_{x\to\infty}\frac{3}{x}+\lim\limits_{x\to\infty}\frac{2}{x^2}}=\dfrac{1-0}{1-0+0}=1$

3. (už trochu rychleji) $\lim\limits_{x\to\infty}\dfrac{x-3x^2}{x-4x^2}=\lim\limits_{x\to\infty}\dfrac{\frac{1}{x}-3}{\frac{1}{x}-4}=\dfrac{-3}{-4}=\dfrac{3}{4}$

4. $\lim\limits_{x\to\infty}\left(\dfrac{x}{1+x}-\dfrac{x}{1-x}\right)=\left(\lim\limits_{x\to\infty}\dfrac{x}{1+x}\right)-\left(\lim\limits_{x\to\infty}\dfrac{x}{1-x}\right)=\left(\lim\limits_{x\to\infty}\dfrac{1}{\frac{1}{x}+1}\right)-\left(\lim\limits_{x\to\infty}\dfrac{1}{\frac{1}{x}-1}\right)=1-(-1)=2$

   alternativně: $\lim\limits_{x\to\infty}\left(\dfrac{x}{1+x}-\dfrac{x}{1-x}\right)=\lim\limits_{x\to\infty}\dfrac{2x^2}{x^2-1}=\lim\limits_{x\to\infty}\dfrac{2}{1-\frac{1}{x^2}}=2$

5. $\lim\limits_{x\to\infty}\left(\dfrac{x^2}{1+x}-\dfrac{x^2}{1-x}\right)=\lim\limits_{x\to\infty}x\left(\dfrac{x}{1+x}-\dfrac{x}{1-x}\right)=\left(\lim\limits_{x\to\infty}x\right)\cdot\lim\limits_{x\to\infty}\left(\dfrac{x}{1+x}-\dfrac{x}{1-x}\right)=\infty\cdot 2=\infty$

   (případně lze využít i postupy jako v minulém bodě)

6. $\lim\limits_{x\to-\infty}\dfrac{x^2-2x+5}{2x^3-x^2+4}=\lim\limits_{x\to-\infty}\dfrac{1-\frac{2}{x}+\frac{5}{x^2}}{2x-1+\frac{4}{x^2}}=\dfrac{1-0+0}{-\infty-1+0}=0$

7. $\lim\limits_{x\to\infty}\dfrac{\sqrt{x}-6x}{3x+1}=\lim\limits_{x\to\infty}\dfrac{\frac{1}{\sqrt{x}}-6}{3+\frac{1}{x}}=\dfrac{0-6}{3+0}=-2$ (využívám toho, že $\lim\limits_{x\to\infty}\frac{1}{\sqrt{x}}=0$, protože $\lim\limits_{x\to\infty}\sqrt{x}=\infty$)