

V úlohách 2.2.1 a 2.2.4 vypočítajte limitu postupnosti:

2.2.1 a) $\lim_{n \rightarrow \infty} (-2n^5 + 3n^2 - 10)$

h) $\lim_{n \rightarrow \infty} \left(\frac{5n - n^5}{2n^5 + n} \right)^4$

b) $\lim_{n \rightarrow \infty} \left(3n^4 - \frac{3}{n^3} + 4n \right)$

i) $\lim_{n \rightarrow \infty} \frac{(n+3)(2n-1)}{(n-3)^2}$

c) $\lim_{n \rightarrow \infty} \frac{3-8n}{n+2}$

j) $\lim_{n \rightarrow \infty} \sqrt{\frac{9+n^2}{4n^2}}$

d) $\lim_{n \rightarrow \infty} \frac{4n^2}{-n+2}$

k) $\lim_{n \rightarrow \infty} \frac{3n+2}{\sqrt{16n^4 + 6n^3 - 2}}$

e) $\lim_{n \rightarrow \infty} \frac{7n+2n^3}{7n^2 - n - 1}$

f) $\lim_{n \rightarrow \infty} \frac{-3n^2 + 4n}{4n^3 - n + 2}$

g) $\lim_{n \rightarrow \infty} \left(\frac{3n-5}{4+3n} \right)^5$

2.2.4 a) $\lim_{n \rightarrow \infty} \left(1 + \frac{1}{5n} \right)^{2n+6}$

g) $\lim_{n \rightarrow \infty} \left(\frac{6+4n}{2+4n} \right)^{3-2n}$

b) $\lim_{n \rightarrow \infty} \left(1 + \frac{7}{3n} \right)^{n-1}$

h) $\lim_{n \rightarrow \infty} \left(\frac{7n+10}{1+7n} \right)^{\frac{n}{3}}$

c) $\lim_{n \rightarrow \infty} \left(\frac{n+5}{n+4} \right)^{2n-1}$

i) $\lim_{n \rightarrow \infty} \left(\frac{3n+6}{3n-1} \right)^n$

d) $\lim_{n \rightarrow \infty} \left(\frac{2n+5}{2n} \right)^{3n-7}$

j) $\lim_{n \rightarrow \infty} \left(\frac{2n-5}{2n-2} \right)^{4n^2}$

e) $\lim_{n \rightarrow \infty} \left(\frac{2n+1}{2n-3} \right)^{3n}$

k) $\lim_{n \rightarrow \infty} \left[\ln \left(\frac{3n+1}{3n-5} \right)^{2-n} \right]$

f) $\lim_{n \rightarrow \infty} \left(\frac{n-1}{n+3} \right)^{5-4n}$

l) $\lim_{n \rightarrow \infty} (n+1) \cdot [\ln(n+1) - \ln(n+2)]$

2.2.1

$$\lim_{n \rightarrow \infty} (-2n^5 + 3n^2 - 10) = \lim_{n \rightarrow \infty} n^5 \cdot \left(-2 + \frac{3}{n^3} - \frac{10}{n^5} \right) = \infty \cdot (-2) = -\infty$$

$\underbrace{\lim_{n \rightarrow \infty} ()}_{= -2}$

limita závorky je -2, protože $\lim_{n \rightarrow \infty} \frac{3}{n^3} = 3 \cdot \lim_{n \rightarrow \infty} \frac{1}{n^3} = 3 \cdot 0 = 0$

$$\lim_{n \rightarrow \infty} \frac{10}{n^5} = 10 \cdot \lim_{n \rightarrow \infty} \frac{1}{n^5} = 0$$

$$[\text{lebo } \frac{1}{\infty^5} = \frac{1}{\infty} = 0]$$

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

$$c) \lim_{n \rightarrow \infty} \frac{3-8n}{n+2} \cdot \frac{\frac{1}{n}}{\frac{1}{n}} = \lim_{n \rightarrow \infty} \frac{\frac{(3)}{n}-8}{1+\frac{(2)}{n}} = \frac{-8}{1} = -8$$

$$[\lim_{n \rightarrow \infty} \frac{3}{n} \text{ aj } \lim_{n \rightarrow \infty} \frac{2}{n} \text{ je } 0]$$

$$d) \lim_{n \rightarrow \infty} \frac{4n^2}{-n+2} \cdot \frac{\frac{1}{n}}{\frac{1}{n}} = \lim_{n \rightarrow \infty} \frac{\frac{(4n)}{n^2} \rightarrow 0}{-1+\frac{2}{n}} = \frac{\infty}{-1} = -\infty$$

[čitatela aj menovatela delíme
na zápornú mocninu n v menovateli]

Základné limity a vzťahy:

$$\lim_{n \rightarrow \infty} n = \infty$$

$$\lim_{n \rightarrow \infty} n = c$$

$$\lim_{n \rightarrow \infty} n = -\infty$$

$$\lim_{n \rightarrow \infty} \frac{1}{n} = 0$$

$$\lim_{n \rightarrow -\infty} \frac{1}{n} = 0$$

$$\lim_{n \rightarrow 0} \frac{1}{n} \quad ? \quad (\text{neexistuje})$$

$$\infty \cdot \infty = \infty$$

$$\sqrt[n]{\infty} = \infty$$

$$\infty \cdot (-\infty) = -\infty \cdot \infty = -\infty$$

$$c^{-\infty} = \frac{1}{c^\infty} = 0$$

$$-\infty \cdot (-\infty) = \infty$$

$$\forall c > 0$$

$$\infty + \infty = \infty$$

$$-\infty - \infty = -\infty$$

$$c \cdot \infty = \begin{cases} -\infty & \text{ak } c < 0 \\ \infty & \text{ak } c > 0 \\ ? & \text{ak } c = 0 \text{ (treba zistiť)} \end{cases}$$

$$\infty + c = \infty \quad \text{pre všetky čísla } c \\ (\text{t.j. } \forall c \in \mathbb{R})$$

$$\infty^\infty = \infty$$

$$\infty^0 = ?$$

$$0^\infty = ?$$

$$\infty - \infty = ?$$

môže byť ľubovoľný

(treba zistiť v konkrétnom prípade)

(2.2.1) e) $\lim_{n \rightarrow \infty} \frac{7n + 2n^3}{7n^2 - n - 1} \cdot \frac{1}{n^2} = \lim_{n \rightarrow \infty} \frac{\frac{7}{n} + 2n^3}{7 - \frac{1}{n} - \frac{1}{n^2}} = \frac{\infty}{7} = \infty$

f) $\lim_{n \rightarrow \infty} \frac{-3n^2 + 4n}{4n^3 - n + 2} \cdot \frac{1}{n^3} = \lim_{n \rightarrow \infty} \frac{\frac{-3n^2}{n^3} + \frac{4n}{n^3}}{\frac{4n^3}{n^3} - \frac{n}{n^3} + \frac{2}{n^3}} = \lim_{n \rightarrow \infty} \frac{\frac{-3}{n} + \frac{4}{n^2}}{4 - \frac{1}{n^2} + \frac{2}{n^3}} = \frac{0}{4} = 0$

g) $\lim_{n \rightarrow \infty} \left(\frac{3n - 5}{4 + 3n} \cdot \frac{1}{n} \right)^5 = \lim_{n \rightarrow \infty} \left(\frac{3 - \frac{5}{n}}{\frac{4}{n} + 3} \right)^5 = \left(\frac{3}{3} \right)^5 = 1^5 = 1$

$(a+b)(a-b) = a^2 - b^2$
$(a+b)^2 = a^2 + 2ab + b^2$
$(a-b)^2 = a^2 - 2ab + b^2$

h) $\lim_{n \rightarrow \infty} \left(\frac{5n - n^5}{2n^5 + n} \cdot \frac{1}{n^5} \right)^4 = \lim_{n \rightarrow \infty} \left(\frac{\frac{5}{n^4} - 1}{2 + \frac{1}{n^4}} \right)^4 = \left(\frac{-1}{2} \right)^4 = \frac{1}{16}$

i) $\lim_{n \rightarrow \infty} \frac{(n+3)(2n-1)}{(n-3)^2} = \lim_{n \rightarrow \infty} \frac{2n^2 - n + 6n - 3}{n^2 - 6n + 9} = \lim_{n \rightarrow \infty} \frac{2n^2 + 5n - 3}{n^2 - 6n + 9} \cdot \frac{1}{n^2} = \lim_{n \rightarrow \infty} \frac{2 + \frac{5}{n} - \frac{3}{n^2}}{1 - \frac{6}{n} + \frac{9}{n^2}} = \frac{2}{1} = 2$

j) $\lim_{n \rightarrow \infty} \sqrt{\frac{9+n^2}{4n^2}} = \lim_{n \rightarrow \infty} \sqrt{\frac{\frac{9}{n^2} + \frac{n^2}{4n^2}}{1}} = \lim_{n \rightarrow \infty} \sqrt{\frac{\frac{9}{4n^2} + \frac{1}{4}}{1}} = \sqrt{\frac{1}{4}} = \frac{1}{2}$

k) $\lim_{n \rightarrow \infty} \frac{3n+2}{\sqrt[4]{16n^4 + 6n^3 - 2}} \cdot \frac{1}{n^2} = \lim_{n \rightarrow \infty} \frac{\frac{3}{n} + \frac{2}{n^2}}{\sqrt[4]{16n^4 + 6n^3 - 2}} = \lim_{n \rightarrow \infty} \frac{\frac{3}{n} + \frac{2}{n^2}}{\sqrt[4]{\frac{16n^4}{n^4} + \frac{6n^3}{n^4} - \frac{2}{n^4}}} = \lim_{n \rightarrow \infty} \frac{\frac{3}{n} + \frac{2}{n^2}}{\sqrt[4]{16 + \frac{6}{n} - \frac{2}{n^3}}} = \frac{0}{\sqrt[4]{16}} = \frac{0}{4} = 0$

[nejvýčisťacia mocnina v menovateli je n^4 , ale je n^2 podíl, teda delíme $\sqrt[4]{n^4} = n$]

2.2.4

$$a) \lim_{n \rightarrow \infty} \left(1 + \frac{1}{5n}\right)^{2n+6}$$

→ pre výpočet tohto druhu limit sa využíva vzorec:

$$\boxed{\lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^n = e}$$

- namiesto „n“ vo vzoreci môže byť ľakotiek čo obsahuje „n“;
podmienkou je, aby v menovateli vo mŕtvi v závorku a hore
v exponente vystupoval ten istý výraz

- našou úlohou potom je upraviť pôvodnú limitu na takúto limitu
a následne vypočítať limitu exponentu (toto, na čo je umocnené „e“),

pretože platí:

$$\lim_{n \rightarrow \infty} \left[\left(1 + \frac{1}{n}\right)^n \right]^x = e^{\lim_{n \rightarrow \infty} x}$$

→ ukážme si to na tomto príklade:

$$\lim_{n \rightarrow \infty} \left(1 + \frac{1}{5n}\right)^{2n+6} = \lim_{n \rightarrow \infty} \left[\left(1 + \frac{1}{5n}\right)^{5n} \right]^{\frac{2n+6}{5n}} = \cancel{e^{\lim_{n \rightarrow \infty} \frac{2n+6}{5n}}} = \underline{\underline{e^{\frac{2}{5}}}}$$

shádzime sa dostať
kvôd $\lim_{n \rightarrow \infty} \left(1 + \frac{1}{f(n)}\right)^{f(n)}$

↓
umocňujeme teda závorku na
výraz, kt. je v menovateli.
To celé je potom umocnené na
pôvodnú mocninu (2n+6) ale ešte
lomeno „5n“, lebo to sme tam
umelo „pridalí“

túto limitu
vypočítame
zvlášť:

$$\lim_{n \rightarrow \infty} \frac{2n+6}{5n \cdot \frac{1}{n}} = \lim_{n \rightarrow \infty} \frac{2 + \frac{6}{n}}{5} = \underline{\underline{\frac{2}{5}}}$$

2.2.4

$$b) \lim_{n \rightarrow \infty} \left(1 + \frac{7}{3n}\right)^{n-1} = \lim_{n \rightarrow \infty} \left[\left(1 + \frac{1}{\frac{3n}{7}}\right)^{\frac{3n}{7}}\right]^{\frac{n-1}{\frac{3n}{7}}} = e^{\lim_{\infty} \frac{n-1}{\frac{3n}{7}}} = e^{\frac{7}{3}}$$

$$\lim_{n \rightarrow \infty} \frac{n-1}{\frac{3n}{7}} = \lim_{\infty} \frac{n-1}{\frac{3n}{7}} = \lim_{\infty} \frac{7 \cdot (n-1)}{3n} = \lim_{n \rightarrow \infty} \frac{7n-7}{3n} \cdot \frac{1}{n} = \lim_{\infty} \frac{7 - \frac{7}{n}}{3} \xrightarrow{0} = \frac{7}{3}$$

Plauti:

$$\frac{\frac{a}{b}}{\frac{c}{d}} = \frac{a \cdot d}{b \cdot c}$$

$$c) \lim_{n \rightarrow \infty} \left(\frac{n+5}{n+4}\right)^{2n-1} = \lim_{n \rightarrow \infty} \left(\frac{n+4+1}{n+4}\right)^{2n-1} = \lim_{\infty} \left(\frac{n+4}{n+4} + \frac{1}{n+4}\right)^{2n-1} = \lim_{\infty} \left[\left(1 + \frac{1}{n+4}\right)^{n+4}\right]^{\frac{2n-1}{n+4}} = e^2$$

$$\lim_{n \rightarrow \infty} \frac{\frac{2n-1}{n}}{\frac{n+4}{n} \cdot \frac{1}{n}} = \lim_{\infty} \frac{2 - \frac{1}{n}}{1 + \frac{4}{n}} \xrightarrow{0} = \frac{2}{1} = 2$$

$$d) \lim_{n \rightarrow \infty} \left(\frac{2n+5}{2n}\right)^{3n-7} = \lim_{\infty} \left(\frac{2n}{2n} + \frac{5}{2n}\right)^{3n-7} = \lim_{\infty} \left[\left(1 + \frac{1}{\frac{2n}{5}}\right)^{\frac{2n}{5}}\right]^{\frac{3n-7}{\frac{2n}{5}}} = e^{\frac{15}{2}}$$

$$\lim_{\infty} \frac{\frac{3n-7}{2n}}{\frac{2n}{5}} = \lim_{\infty} \frac{\frac{3n-7}{1}}{\frac{2n}{5}} = \lim_{\infty} \frac{5 \cdot (3n-7)}{2n} = \lim_{\infty} \frac{15n-35}{2n} \cdot \frac{1}{n} = \lim_{\infty} \frac{15 - \frac{35}{n}}{2} \xrightarrow{0} = \frac{15}{2}$$

$$e) \lim_{n \rightarrow \infty} \left(\frac{2n+1}{2n-3}\right)^{3n} = \lim_{n \rightarrow \infty} \left(\frac{2n-3+4}{2n-3}\right)^{3n} = \lim_{\infty} \left(\frac{2n-3}{2n-3} + \frac{4}{2n-3}\right)^{3n} = \lim_{\infty} \left[\left(1 + \frac{1}{\frac{2n-3}{4}}\right)^{\frac{2n-3}{4}}\right]^{\frac{3n}{\frac{2n-3}{4}}} = e^6$$

$$\lim_{n \rightarrow \infty} \frac{\frac{3n}{2n-3}}{\frac{4}{2n-3}} = \lim_{\infty} \frac{\frac{12n}{2n-3} \cdot \frac{1}{n}}{\frac{4}{2n-3}} = \lim_{\infty} \frac{12}{2 - \frac{3}{n}} \xrightarrow{0} = \frac{12}{2} = 6$$

(2e2o4) f) $\lim_{n \rightarrow \infty} \left(\frac{n-1}{n+3} \right)^{5-4n} = \lim_{\infty} \left(\frac{n+3-4}{n+3} \right)^{5-4n} = \lim_{\infty} \left(\frac{\frac{n+3}{n+3} + \frac{-4}{n+3}}{n+3} \right)^{5-4n} = \lim_{\infty} \left[\left(1 + \frac{1}{\frac{n+3}{-4}} \right)^{\frac{n+3}{-4}} \right]^{\frac{5-4n}{\frac{n+3}{-4}}} \stackrel{\textcircled{*}}{=} e^{16}$

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$$\textcircled{*} \lim_{n \rightarrow \infty} \frac{\frac{5-4n}{n+3}}{-4} = \lim_{\infty} \frac{-4 \cdot (5-4n)}{n+3} = \lim_{\infty} \frac{-20+16n}{n+3} \cdot \frac{1}{n} = \lim_{\infty} \frac{16 - \frac{20}{n} \xrightarrow{0}}{1 + \frac{3}{n}} = \frac{16}{1} = \boxed{16}$$

g) $\lim_{n \rightarrow \infty} \left(\frac{6+4n}{2+4n} \right)^{3-2n} = \lim_{n \rightarrow \infty} \left(\frac{2+4n+4}{2+4n} \right)^{3-2n} = \lim_{\infty} \left(\frac{2+4n}{2+4n} + \frac{4}{2+4n} \right)^{3-2n} = \lim_{\infty} \left[\left(1 + \frac{1}{\frac{2+4n}{4}} \right)^{\frac{2+4n}{4}} \right]^{\frac{3-2n}{\frac{2+4n}{4}}} \stackrel{\textcircled{*}}{=} e^{-2}$

$$\textcircled{*} \lim_{n \rightarrow \infty} \frac{\frac{3-2n}{2+4n}}{\frac{4}{4}} = \lim_{\infty} \frac{4 \cdot (3-2n)}{2+4n} = \lim_{n \rightarrow \infty} \frac{12-8n}{2+4n} \cdot \frac{1}{n} = \lim_{\infty} \frac{\frac{12}{n}-8 \xrightarrow{0}}{\frac{2}{n}+4} = \frac{-8}{4} = \boxed{-2}$$

h) $\lim_{n \rightarrow \infty} \left(\frac{7n+10}{1+7n} \right)^{\frac{n}{3}} = \lim_{\infty} \left(\frac{1+7n+9}{1+7n} \right)^{\frac{n}{3}} = \lim_{\infty} \left(\frac{1+7n}{1+7n} + \frac{9}{1+7n} \right)^{\frac{n}{3}} = \lim_{\infty} \left[\left(1 + \frac{1}{\frac{1+7n}{9}} \right)^{\frac{1+7n}{9}} \right]^{\frac{\frac{n}{3}}{\frac{1+7n}{9}}} \stackrel{\textcircled{*}}{=} e^{\frac{3}{7}}$

$$\textcircled{*} \lim_{n \rightarrow \infty} \frac{\frac{n}{3}}{\frac{1+7n}{9}} = \lim_{\infty} \frac{\frac{9n}{3 \cdot (1+7n)}}{1+7n} = \lim_{n \rightarrow \infty} \frac{3n}{1+7n} \cdot \frac{1}{n} = \lim_{\infty} \frac{3}{\frac{1}{n}+7} \xrightarrow{0} = \frac{3}{7}$$

i) $\lim_{n \rightarrow \infty} \left(\frac{3n+6}{3n-1} \right)^{n^2} = \lim_{\infty} \left(\frac{3n-1+7}{3n-1} \right)^{n^2} = \lim_{\infty} \left(\frac{3n-1}{3n-1} + \frac{7}{3n-1} \right)^{n^2} = \lim_{\infty} \left[\left(1 + \frac{1}{\frac{3n-1}{7}} \right)^{\frac{3n-1}{7}} \right]^{\frac{n^2}{\frac{3n-1}{7}}} \stackrel{\textcircled{*}}{=} e^{\infty} = \infty$

$$\textcircled{*} \lim_{n \rightarrow \infty} \frac{\frac{n^2}{3n-1}}{\frac{7}{7}} = \lim_{\infty} \frac{7n^2 \cdot \frac{1}{n}}{3n-1} = \lim_{\infty} \frac{7n \xrightarrow{0}}{3 - \frac{1}{n}} = \frac{\infty}{3} = \boxed{\infty}$$

(2.2.4)

$$j) \lim_{n \rightarrow \infty} \left(\frac{2n-5}{2n-2} \right)^{4n^2} = \lim_{\infty} \left(\frac{2n-2-3}{2n-2} \right)^{4n^2} = \lim_{\infty} \left(\frac{2n-2}{2n-2} + \frac{-3}{2n-2} \right)^{4n^2} = \lim_{\infty} \left[\left(1 + \frac{1}{\frac{2n-2}{-3}} \right)^{\frac{2n-2}{-3}} \right]^{\frac{4n^2}{2n-2}} \stackrel{\textcircled{20}}{\rightarrow} e^{-\infty} = 0$$

$$\textcircled{*} \lim_{n \rightarrow \infty} \frac{\frac{4n^2}{2n-2}}{-3} = \lim_{n \rightarrow \infty} \frac{-12n^2 \cdot \frac{1}{n}}{2n-2 \cdot \frac{1}{n}} = \lim_{\infty} \frac{-12n}{2 - \frac{2}{n}} \stackrel{\textcircled{20}}{\rightarrow} \infty = \frac{-\infty}{2} = -\infty$$

$$k) \lim_{\infty} \left[\ln \left(\frac{3n+1}{3n-5} \right)^{2n} \right] = \lim_{n \rightarrow \infty} \left[(2-n) \cdot \ln \left(\frac{3n-5+6}{3n-5} \right) \right] = \lim_{\infty} \left[(2-n) \cdot \ln \left(\frac{3n-5}{3n-5} + \frac{6}{3n-5} \right) \right] = \lim_{n \rightarrow \infty} \left(2-n \right) \cdot \ln \left(1 + \frac{1}{\frac{3n-5}{6}} \right)^{\frac{3n-5}{6}}$$

$$= \lim_{n \rightarrow \infty} \left[(2-n) \cdot \frac{1}{\frac{3n-5}{6}} \cdot \ln \left(1 + \frac{1}{\frac{3n-5}{6}} \right)^{\frac{3n-5}{6}} \right] = \lim_{\infty} \left[\frac{6 \cdot (2-n)}{3n-5} \cdot \underbrace{\ln \left(1 + \frac{1}{\frac{3n-5}{6}} \right)^{\frac{3n-5}{6}}}_{\rightarrow e} \right] \stackrel{\textcircled{20}}{\rightarrow} -2 \cdot \ln e = -2 \cdot 1 = -2$$

$$\textcircled{*} \lim_{n \rightarrow \infty} \frac{6 \cdot (2-n)}{3n-5} = \lim_{\infty} \frac{\frac{12-6n}{3n-5} \cdot \frac{1}{n}}{\frac{1}{n}} = \lim_{\infty} \frac{\frac{12}{n}-6}{3-\frac{5}{n}} \stackrel{\textcircled{20}}{\rightarrow} 0 = -\frac{6}{3} = -2$$

Plati: $\ln e = 1$
 $\log_e e = 1$

Vo výpočte som 2x využil vzťah: $\log(x^y) = y \cdot \log x$

(2.2.4)

$$l) \lim_{n \rightarrow \infty} (n+1) \cdot [\ln(n+1) - \ln(n+2)] = \lim_{n \rightarrow \infty} [(n+1) \cdot \ln \frac{n+1}{n+2}] = \lim_{n \rightarrow \infty} [(n+1) \cdot \ln \left(\frac{n+2}{n+2} + \frac{-1}{n+2} \right)] =$$

Platí: $\log x + \log y = \log(x \cdot y)$
 $\log x - \log y = \log \left(\frac{x}{y} \right)$

$$= \lim_{n \rightarrow \infty} \left((n+1) \cdot \ln \left[\left(1 + \frac{1}{\frac{n+2}{-1}} \right)^{\frac{n+2}{-1}} \right]^{\frac{1}{\frac{n+2}{-1}}} \right) = \lim_{n \rightarrow \infty} \left(\frac{-(n+1)}{n+2} \cdot \ln \underbrace{\left(1 + \frac{1}{\frac{n+2}{-1}} \right)^{\frac{n+2}{-1}}}_{\rightarrow e} \right) = -1 \cdot \ln e = -1 \cdot 1 = -1$$

$$\textcircled{*} \lim_{n \rightarrow \infty} \frac{-(n+1)}{n+2} = \lim_{n \rightarrow \infty} \frac{-n-1}{n+2} \cdot \frac{\frac{1}{n}}{\frac{1}{n}} = \lim_{n \rightarrow \infty} \frac{-1 - \left(\frac{1}{n} \right)^0}{1 + \left(\frac{2}{n} \right)} = \frac{-1}{1} = -1$$

(3.1.1)

$$a) \lim_{x \rightarrow 2} \frac{x^2 - x - 2}{x^2 - 2x}$$

ak máme limitu funkcie a x sa blíži k nejakému číslu (v tomto prípade $x \rightarrow 2$), tak vždy skusime najprv číslo dosadiť za x :

$$\lim_{x \rightarrow 2} \frac{x^2 - x - 2}{x^2 - 2x} \stackrel{?}{=} \frac{2^2 - 2 - 2}{2^2 - 2 \cdot 2} = \frac{0}{0} \rightarrow \text{nemá zmysel}$$

~ výslo nám $\frac{0}{0}$, čo je nesmysel.

Postupujeme teda tak, že čitatelia aj menovatelia upravíme na

Evar: $\frac{(x-a) \cdot \text{necō}}{(x-a) \cdot \text{necō}}$, kde a je číslo,

ke ktorému sa blíži x (u nás $a=2$):

[keby po dosadení výslo niečo pekné, teda nejaké číslo alebo $\pm \infty$, bol by to hnedý výsledok]

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