$\boxed{\text{Př}}$ $\lim \log_3\left(\frac{27n+3}{n+1}\right)$

1. limita vnitřní posloupnosti

$$\lim \frac{27n+3}{n+1} = 27$$

2. pokud ↑ leží v def oboru $\log_3(\cdot)$, stačí dosadit

$$\Rightarrow \quad \log_3(27) = 3$$

$$\Rightarrow \lim \log_3\left(\frac{27n+3}{n+1}\right) = 3$$

$\boxed{\text{Př}}$ $\lim \sqrt{n^2+4} - \sqrt{n^2-4} \cdot \frac{\sqrt{n^2+4}+\sqrt{n^2-4}}{\sqrt{n^2+4}+\sqrt{n^2-4}} =$

FINTA Č.3

$$= \lim \frac{8}{\sqrt{n^2+4}+\sqrt{n^2-4}} = \lim \frac{8}{\sqrt{n^2\left(1+\frac{4}{n^2}\right)}+\sqrt{n^2\left(1-\frac{4}{n^2}\right)}} =$$

$$= \lim \frac{8}{n\left(\sqrt{1+\frac{4}{n^2}}+\sqrt{1-\frac{4}{n^2}}\right)} \overset{\text{VOAL}}{=} \lim \frac{1}{n} \cdot \lim \frac{8}{\sqrt{1+\frac{4}{n^2}}+\sqrt{1-\frac{4}{n^2}}} \overset{\text{VOAL}}{=}$$

$$= 0 \cdot \frac{8}{\sqrt{1+0}+\sqrt{1-0}} = 0 \cdot \frac{8}{2} = 0$$

$\boxed{P\pi}$

$$\lim \frac{\sqrt[4]{16n^2-1}\cdot\sqrt[4]{(n+1)(n-3)}}{n(3n-1)-\frac{1}{3}(3n+5)^2} =$$

$$= \lim \frac{\sqrt[4]{(16n^2-1)\cdot(n^2-2n-3)}}{3n^2-n-\frac{1}{3}(9n^2+30n+25)} =$$

$\boxed{\sqrt[4]{16n^4}=2n}$

$$= \lim \frac{\sqrt[4]{(16n^4-2\cdot 16n^3-3\cdot 16n^2-n^2+2n+3}}{-11n-\frac{25}{3}} =$$

$$= \lim \frac{2\cancel{n}\sqrt[4]{1-\frac{2\cdot 16n^3}{16n^4}-\frac{3\cdot 16n^2}{16n^4}-\frac{n^2}{16n^4}+\frac{2n}{16n^4}+\frac{3}{16n^4}}}{-11\cancel{n}\left(1+\frac{25}{3}\cdot\frac{1}{11n}\right)} =$$

$$\overset{\text{VOAL}}{=} \frac{2\cdot\sqrt{1-0-0-0+0+0}}{-11\left(1+\frac{25}{3}\cdot 0\right)} = \frac{2}{-11} = \frac{-2}{11}$$

P12

$$\lim \frac{\left(\frac{3}{4}\right)^{2n-1} - \left(\frac{2}{6}\right)^{n+1}}{\left(\frac{18}{32}\right)^{n} + \left(\frac{1}{23}\right)^{n}} =$$

$$\left(\frac{3}{4}\right)^{2n-1} = \left(\frac{3}{4}\right)^{2n} \cdot \left(\frac{3}{4}\right)^{-1} = \left(\frac{9}{16}\right)^{n} \cdot \frac{4}{3}$$

$$\left(\frac{2}{6}\right)^{n+1} = \left(\frac{1}{3}\right)^{n+1} = \left(\frac{1}{3}\right)^{n} \cdot \frac{1}{3}$$

$$= \lim \frac{\left(\frac{9}{16}\right)^{n} \cdot \frac{4}{3} - \left(\frac{1}{3}\right)^{n} \cdot \frac{1}{3}}{\left(\frac{9}{16}\right)^{n} + \left(\frac{1}{23}\right)^{n}} =$$

FINTA ē.2

$$\frac{\left(\frac{1}{3}\right)^{n}}{\left(\frac{9}{16}\right)^{n}} = \left(\frac{1}{3} \cdot \frac{16}{9}\right)^{n}$$

$$= \lim \frac{\cancel{\left(\frac{9}{16}\right)^{n}} \cdot \left(\frac{4}{3} - \frac{1}{3}\left(\frac{1}{3} \cdot \frac{16}{9}\right)^{n}\right)}{\cancel{\left(\frac{9}{16}\right)^{n}} \left(1 + \left(\frac{16}{9} \cdot \frac{1}{23}\right)^{n}\right)} =$$

$$\overset{\text{VOAL}}{=} \quad \frac{\frac{4}{3} - \frac{1}{3} \cdot 0}{1 + 0} = \frac{4}{3}$$

$+ \lim q^n = 0$

$|q| < 1$

$\boxed{\text{Př}}$

$$\lim \frac{3\cdot 3^{2n} - \frac{1}{(23)^n} + 3\cdot\left(\frac{9}{2}\right)^{2n}}{8\cdot 9^n - \left(\frac{1}{3}\right)^{5n} + 5\,(4{,}5)^{2n}} =$$

DOMINANTNÍ ČLEN

FINTA Č. 2

$$= \lim \frac{\cancel{\left(\frac{9}{2}\right)^{2n}}\left(3\cdot\left(\frac{2}{9}\cdot 3\right)^{2n} - \left(\frac{4}{81}\cdot\frac{1}{23}\right)^{n} + 3\right)}{\cancel{\left(\frac{9}{2}\right)^{2n}}\left(8\cdot\left(\frac{4}{81}\cdot 9\right)^{n} - \left(\frac{4}{81}\cdot\frac{1}{3^5}\right)^{n} + 5\right)} =$$

$$\overset{\text{VOAL}}{=} \frac{3\cdot 0 - 0 + 3}{0 - 0 + 5} = \frac{3}{5}$$

$\lim q^n = 0$

$|q| < 1$

$\boxed{P_R}$ FINTA č.3

$$\lim \frac{\sqrt{4n^3+2n^2-3}-\sqrt{4n^3-n^2+2}}{\sqrt{4n}} \cdot \frac{\sqrt{4n^3+2n^2-3}+\sqrt{4n^3-n^2+2}}{-\,''\,-}$$

$$= \lim \frac{3n^2-1}{\sqrt{4n}\left(\sqrt{4n^3+2n^2-3}+\sqrt{4n^3-n^2+2}\right)} =$$

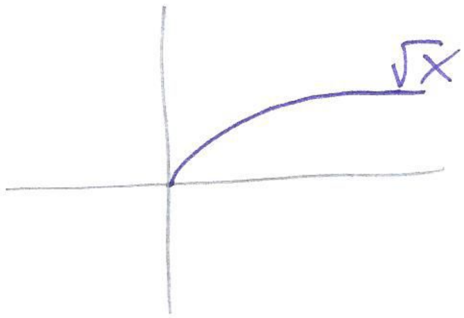
$$= \lim \frac{3n^2\left(1-\frac{1}{3n^2}\right)}{\sqrt{16n^4}\left(\sqrt{1+\frac{2n^2}{4n^3}-\frac{3}{4n^3}}+\sqrt{1-\frac{n^2}{4n^3}+\frac{2}{4n^3}}\right)} =$$

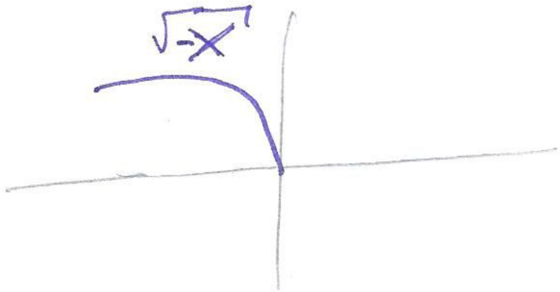
$$= \lim \frac{3\cancel{n^2}\left(1-\underbrace{\frac{1}{3n^2}}_{\to 0}\right)}{4\cancel{n^2}\left(\sqrt{1+\underbrace{\frac{2n^2}{4n^3}}_{0}-\underbrace{\frac{3}{4n^3}}_{0}}+\sqrt{1-\underbrace{\frac{n^2}{4n^3}}_{0}+\underbrace{\frac{2}{4n^3}}_{0}}\right)} =$$

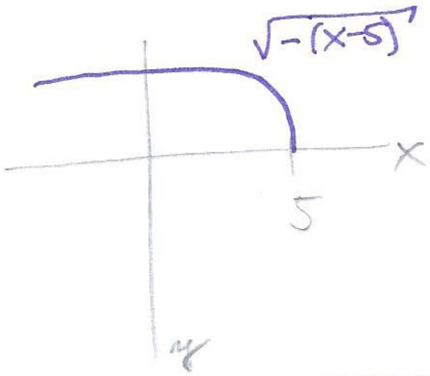
$$\overset{VOAL}{=} \frac{3\cdot(1-0)}{4\left(\sqrt{1+0-0}+\sqrt{1-0+0}\right)} = \frac{3}{8}$$

nakreslete graf

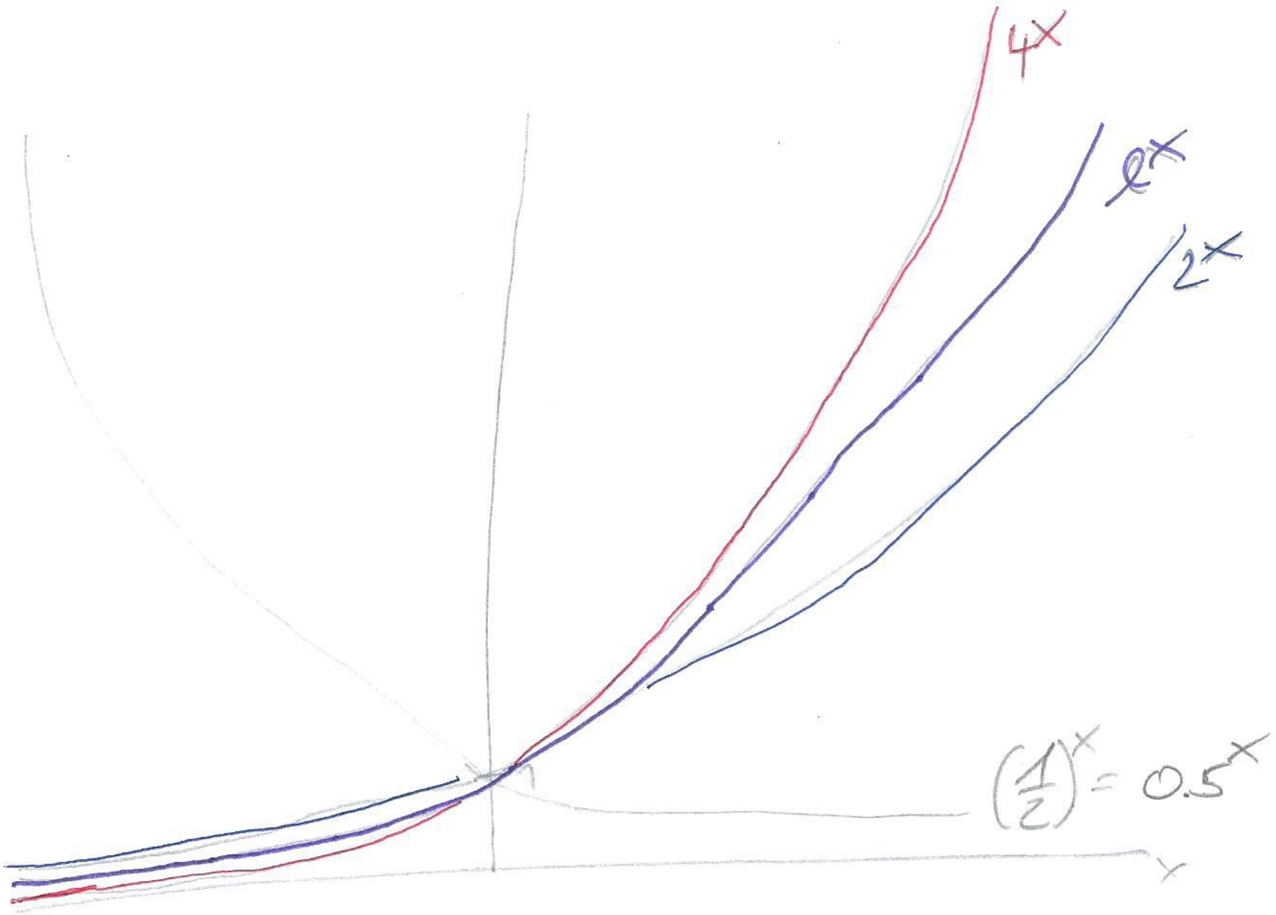
Př $\sqrt{5-x} = \sqrt{-(x-5)}$

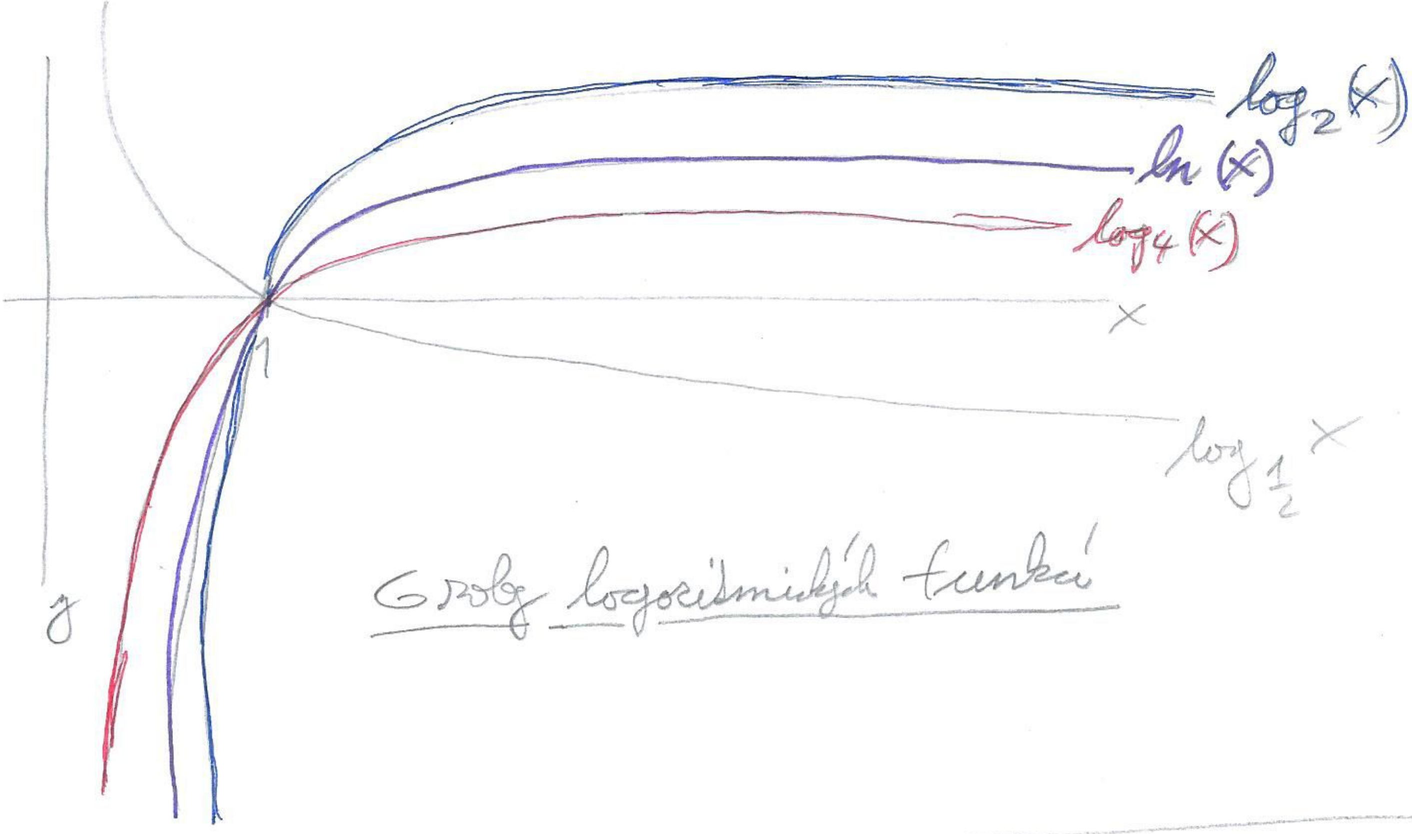






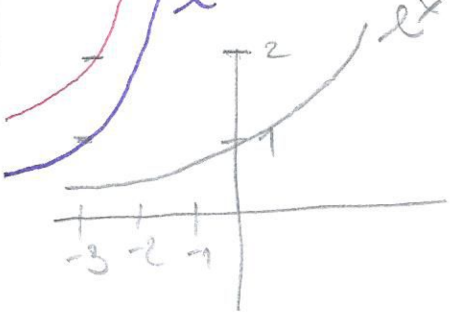
Grafy exponenciálních funkcí



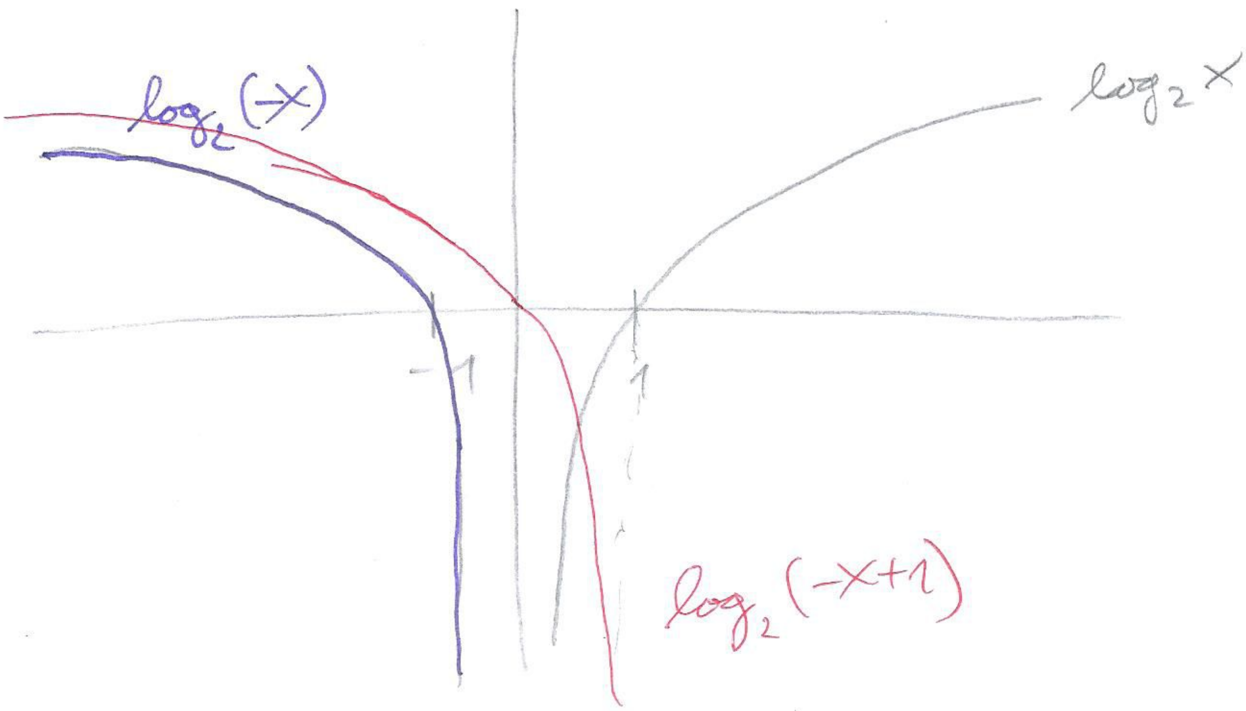


Grafy logaritmických funkcí

Př nakreslete graf $e^{x+3}+1$



Př nakreslete graf $\log_2(-x+1) = \log_2(-(x-1))$



Př

$$\lim_{n\to\infty} \sqrt{n^2+3n} - n = \frac{3}{2}$$ FINTA Č.3

Př $$\lim 2n - \sqrt{4n^2+7n} = -\frac{7}{4}$$

Př $$\lim_{n\to\infty} \frac{2\cdot 3^n + 3\cdot 2^n}{2^{n-1} - 3^{n+1}} = -\frac{2}{3}$$

Př $$\lim_{n\to\infty} \frac{5\cdot 4^{n-1} + 3\cdot 2^{n+1}}{4^n - 2^{n+6}} = \frac{5}{4}$$ FINTA Č.2

Př $$\lim \frac{\left(\frac{1}{7}\right)^n + \left(\frac{1}{2}\right)^{n+1}}{\left(\frac{1}{4}\right)^n - \left(\frac{1}{2}\right)^{n+2}} = -2$$