Matematika 1 cvičení

0.1 Definiční obor

$$f(a) = \sqrt{\frac{x^2-4x+3}{x+4}}$$
$$\frac{x^2-4x+3}{x+4} \geq 0 \to \frac{(x-3)(x-1)}{x+4}$$
$$D(f) = (-4;1\rangle \cup \langle 3;\infty)$$

$$f(x) = \frac{\ln(x^2-1)}{\ln(x+4)}$$
$$D(f) = (-4;-3) \cup (-3;-2) \cup (1;\infty)$$

0.2 Grafy funkcí

funkce	D	H	Vlasntnosti
$f(x) = 2x-1$	$D_x = R$	$H_x = R$	rostoucí, prostá, spojitá
$g(x) = x^2+2x-8$	$D_x = R$	$H_x = \langle -9;\infty)$	–
$h(x) = \frac{(x-1)^5}{32} - 1$	$D_x = R$	$H_x = R$	–
$i(x) = \sqrt{2x-4}$	$D_x = \langle 2;\infty)$	$H_x = \langle 0;\infty)$	–
$j(x) = \frac{3x+3}{3x+1}$	$D_x = (-\infty;-\frac{1}{3}) \cup (-\frac{1}{3};\infty)$	$H_x = (-\infty;1) \cup (1;\infty)$	–
$k(x) = \left(\frac{1}{3}\right)^{x-2} - 3$	$D_x = R$	$H_y = (-3;\infty)$	–

Limity posloupností

$$\lim_{n\to\infty} \frac{1}{n} = 0$$
$$\lim_{n\to\infty} a = a$$
$$\lim_{n\to\infty} n = \infty$$
$$\lim_{n\to\infty} (-1)^n = neexistuje$$
$$\lim_{n\to\infty} \left(-\frac{1}{2}\right)^n = 0$$
$$\lim_{n\to\infty} \frac{3n^2-4n}{1+2n^2} = \lim_{n\to\infty} \frac{(3n^2-4n)\cdot\frac{1}{n^2}}{(1+2n^2)\cdot\frac{1}{n^2}} = \lim_{n\to\infty} \frac{3-\frac{4}{n}}{\frac{1}{n}+2} = \underline{\underline{\frac{3}{2}}}$$
$$\lim_{n\to\infty} \frac{4n^3-2n-\sqrt{n}}{1-n^2} = \lim_{n\to\infty} \frac{4n-\frac{2}{n}-\frac{1}{\sqrt{n^3}}}{\frac{1}{n^2}-1} = \left[\frac{\infty}{-1}\right] = \underline{\underline{-\infty}}$$
$$\lim_{n\to\infty} \frac{1}{\sqrt{n^2+1}-n} \cdot \frac{\sqrt{n^2+1}+n}{\sqrt{n^2+1}+n} = \lim_{n\to\infty} \frac{\sqrt{n^2+1}+n}{n^2+1-n^2} = \lim_{n\to\infty} \frac{\sqrt{n^2+1}+n}{1} = \lim_{n\to\infty} \left(\sqrt{n^2+1}+n\right) = \underline{\underline{\infty}}$$
$$\lim_{n\to\infty} \left(\sqrt{2n-1}-\sqrt{2n+3}\right) \cdot \frac{\sqrt{2n-1}+\sqrt{2n+3}}{\sqrt{2n-1}+\sqrt{2n+3}} = \frac{-4}{\sqrt{2n-1}+\sqrt{2n+3}} = \underline{\underline{\left[\frac{-4}{\infty}\right]}}$$
$$\lim_{n\to\infty} \sqrt[n]{n} = 1$$
$$\lim_{n\to\infty} \left(1+\frac{1}{2}\right)^n = e$$