(5) $f(x)=\operatorname{arctg}\frac{\sqrt{3}}{x^2}$ $\quad D(f)=\mathbb{R}\setminus\{0\}$, sudá funkce.

- $f'(x)=\dfrac{1}{1+\left(\frac{\sqrt{3}}{x^2}\right)^2}\cdot\sqrt{3}\cdot(-2)\,x^{-3}=\dfrac{x^4}{x^4+3}\cdot\dfrac{(-2\sqrt{3})}{x^3}=\dfrac{-2\sqrt{3}\cdot x}{x^4+3}\quad\forall x\neq 0$

$f'(x)=0$ pro $x=0$, ale $0\notin D(f)$ $\Rightarrow$ nemá stac. body.

f'	$\oplus$		$\ominus$	
f	$\nearrow$	0	$\searrow$	

$\boxed{\text{klesající na } (0,\infty),\ \text{rostoucí na } (-\infty,0),\ \text{nemá lokální extrémy}}$ (0.8)

- $f''(x)=-2\sqrt{3}\,\dfrac{x^4+3-x(4x^3)}{(x^4+3)^2}=-2\sqrt{3}\,\dfrac{-3x^4+3}{(x^4+3)^2}=6\sqrt{3}\,\dfrac{x^4-1}{(x^4+3)^2}\quad\forall x\neq 0.$

$f''(x)=0$ pro $x=\pm 1$.

f''	$\oplus$		$\ominus$		$\ominus$		$\oplus$
f	$\cup$	-1	$\cap$	0	$\cap$	1	$\cup$
		infl.				infl.	

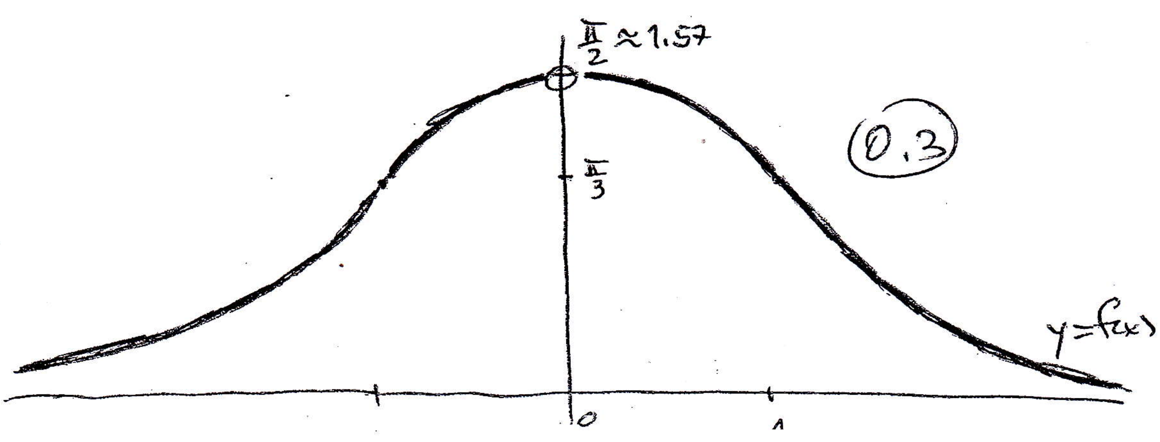
$\boxed{\begin{array}{l}\text{Konvexní na } (-\infty,-1],[1,\infty)\\ \text{Konkávní na } [-1,0),(0,1]\\ \text{inflexní body v } x=\pm1\\ f(\pm1)=\operatorname{arctg}\sqrt{3}=\frac{\pi}{3}\approx 1.05\end{array}}$ (0.8)

asymptoty bez směrnice nejsou $\boxed{\lim_{x\to 0}\operatorname{arctg}\frac{\sqrt{3}}{x^2}=\frac{\pi}{2}}$

se směrnicí: $a=\lim_{x\to\pm\infty}\dfrac{\operatorname{arctg}\frac{\sqrt{3}}{x^2}}{x}=0$, $\quad\operatorname{arctg}\frac{\sqrt{3}}{x^2}\to 0$

$b=\lim_{x\to\pm\infty}\operatorname{arctg}\frac{\sqrt{3}}{x^2}=0$ $\Bigg\}\Rightarrow\boxed{y=0 \text{ v } \pm\infty}$ (0.1)

graf.



(0.3)

(2.0)