(1) monotonie + lok. extrémy

$$f(x) = \operatorname{arctg}\left((2-x)|2+x|\right)$$

$D_f = \mathbb{R}$

$$f(x) = \begin{cases} \operatorname{arctg}\left((2-x)(2+x)\right) = \operatorname{arctg}(4-x^2) & x \geq -2 \\ \operatorname{arctg}\left((2-x)(-2-x)\right) = \operatorname{arctg}(x^2-4) & x < -2 \end{cases}$$

<u>spojitost v $x=-2$</u>

$$\lim_{x \to -2^-} \operatorname{arctg}(x^2-4) = \left[\operatorname{arctg}\left((-2)^2-4\right)\right] = 0$$

$$\lim_{x \to -2^+} \operatorname{arctg}(4-x^2) = \left[\operatorname{arctg}\left(4-(-2)^2\right)\right) = 0$$

↪ je spojitá na $\mathbb{R}$

<u>monotonie:</u>

<u>$x < -2$:</u>

$$f(x) = \operatorname{arctg}(x^2-4)$$

$$f'(x) = \frac{2x}{1+(x^2-4)^2}$$

stac. body:

$f'(x) = 0$

<u>$x \geq -2$:</u>

$$f(x) = \operatorname{arctg}(x^2-4)$$

$$f'(x) = \frac{-2x}{1+(4-x^2)^2}$$

$$\frac{-2x}{1+(4-x^2)^2} = 0$$

$f'(x)=0$

$$\frac{2x}{1+(x^2-4)^2}=0$$

($x=0$ jen mimo interval)

$$\frac{\overset{\text{vždy záporné}}{2x}}{\underset{\text{vždy kladné}}{1+(x^2-4)^2}}<0$$

na celém intervalu

$1+(4-x^2)$

$\underline{\underline{x=0}}$

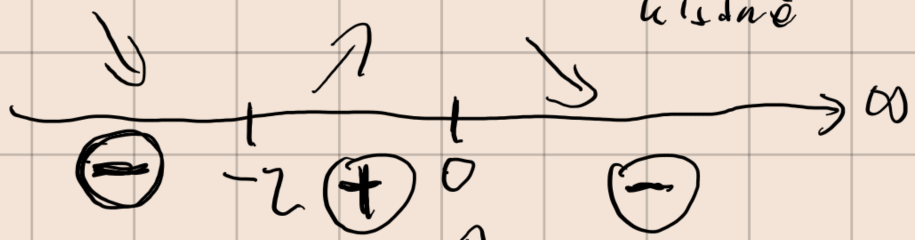
$(-2;0)$ | $(0;\infty)$

$f'(x)>0$

$$\frac{\overset{\text{klad.}}{-2x}}{\underset{\text{při? kladné}}{1+(4-x^2)^2}}$$

$f'(x)<0$

$$\frac{\text{záp.}}{\text{kladné}}$$



minimum

maximum

$\operatorname{arctg}\left(\left|(2-(-2))\right|2+(-2)\right|\right)$

$=\operatorname{arctg}(0)=0$

$\operatorname{arctg}\left(\left|(2-0)\right|2+0\right|\right)$

$=\operatorname{arctg}(4)$

② min a max na $\langle -5;0\rangle$

$$f(x)=\ln(12-4x-x^2)$$

$12-4x-x^2>0$

$-x^2-4x+12>0$

$x^2+4x-12<0$

$-6 \quad 2$

$x \in (-6, 2)$

$\Rightarrow \langle -5; 0 \rangle$ je ok

$$f'(x) = \frac{1}{12-4x-x^2}(-4-2x) = \frac{-4-2x}{12-4x-x^2}$$

$$\frac{-4-2x}{12-4x-x^2} = 0$$

$2x = -4$

$\underline{x = -2}$

min max

-5 $+$ -2 $-$ 0

$$f'(-3) = \frac{-4-2(-3)}{12-4(-3)-(-3)^2} = \frac{2}{15} \; +$$

$$f'(-1) = \frac{-4-2(-1)}{12-4(-1)-(-1)^2} = \frac{-2}{15} \; -$$

$$f'(-2) = \ln(12-4(-2)-(-2)^2) = \ln(16)$$

$$f'(-5) = \ln(12-4(-5)-25) = \ln(7) \Rightarrow \text{min}$$

$$f'(0) = \ln(12)$$