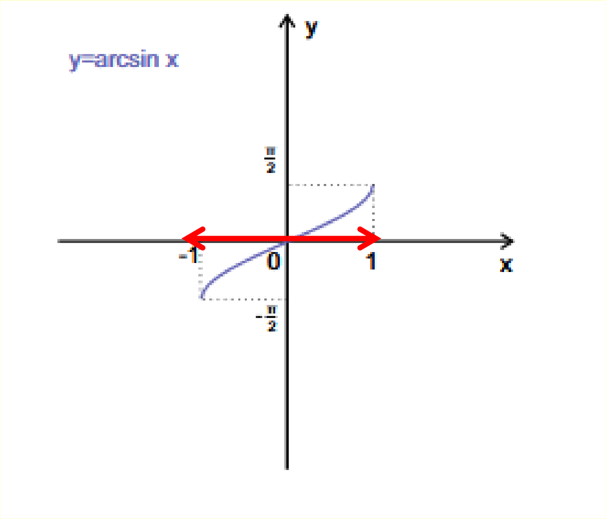
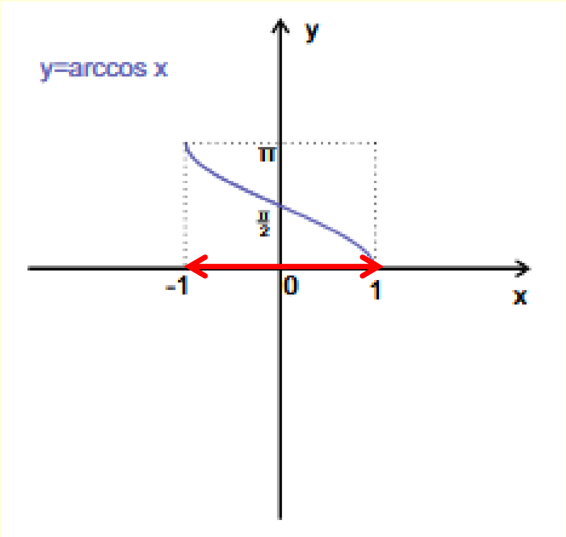
Matematika I – 2.cvičenie

Podmienky určovania D(f)

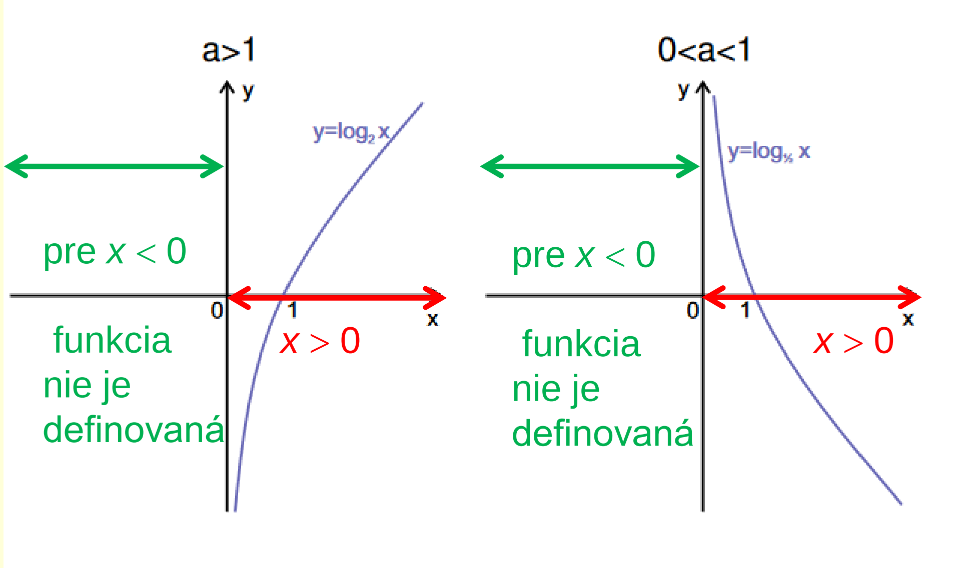
- menovateľ zlomku sa nesmie rovnať nule $\frac{a}{b} \rightarrow b \neq 0$
- výraz pod párnou odmocninou musí byť nezáporný $\sqrt[2n]{x} \rightarrow x \geq 0$
- funkcie $y = \arcsin x, y = \arccos x$ sú definované pre $\mathbf{-1 \leq x \leq 1}$





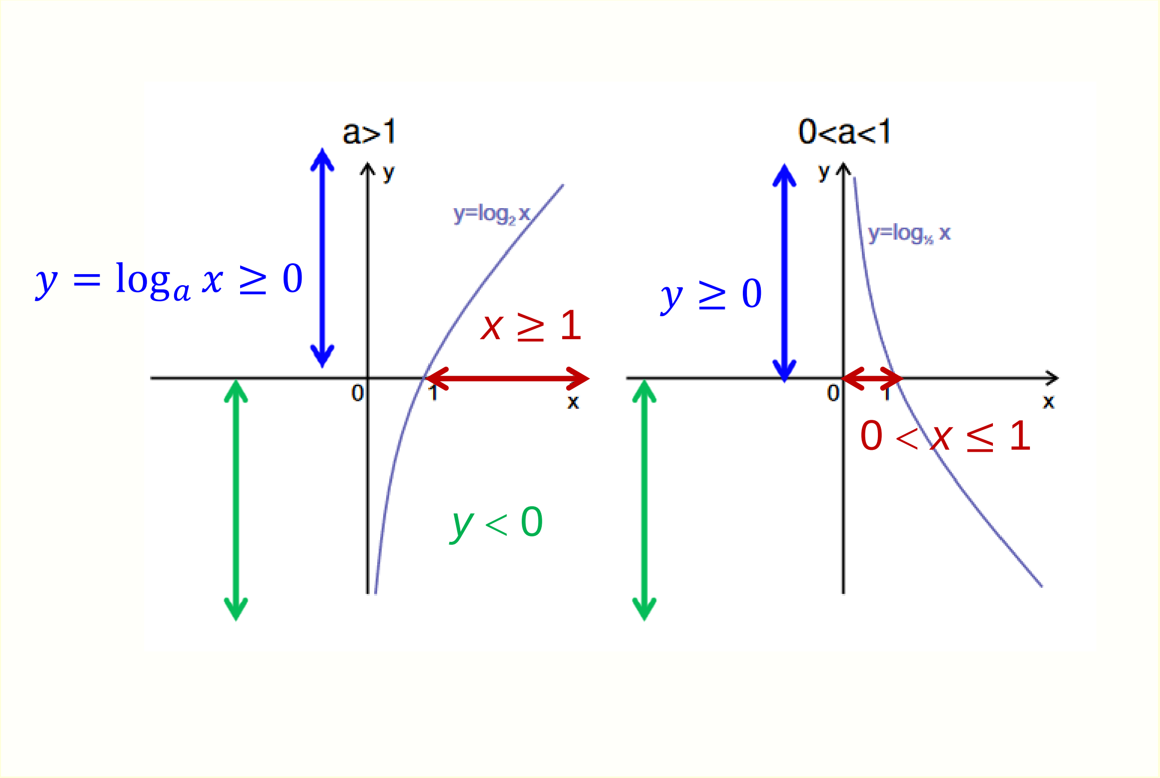
- logaritmická funkcia je definovaná len pre kladný argument

$$\log_a x \rightarrow x > 0$$
$$\ln x \rightarrow x > 0$$



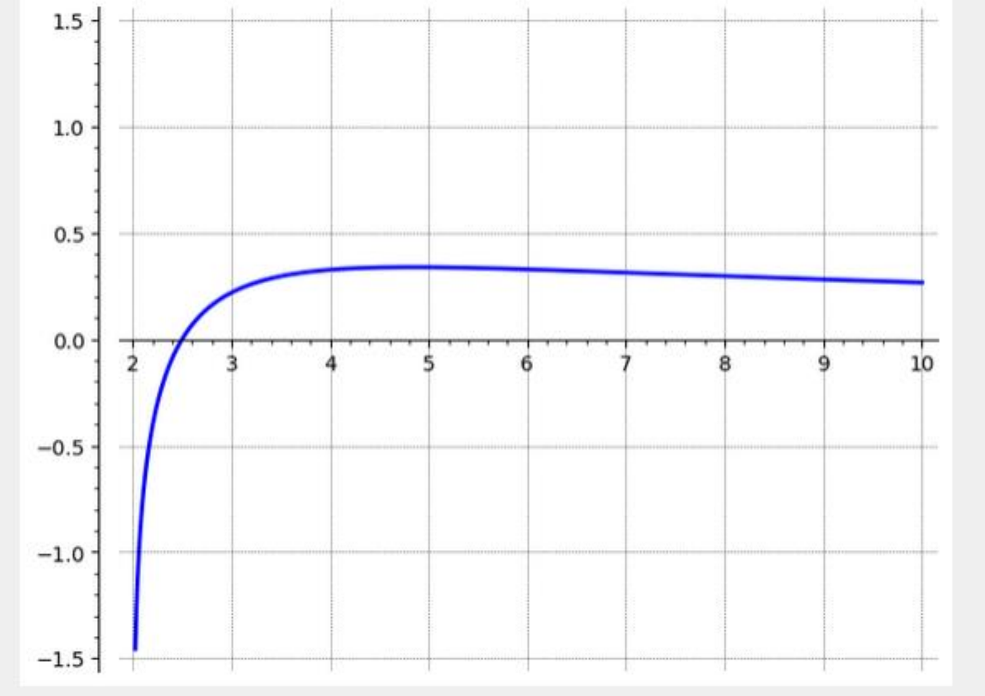
ak $a > 1$, potom $\log_a x \geq 0$ práve vtedy, ak $x \geq 1$

ak $0 < a < 1$, potom $\log_a x \geq 0$ práve vtedy, ak $0 < x \leq 1$



Pr. 1: Určte definičný obor funkcie:

$$f: y = \frac{\ln(2x-4)}{\sqrt{(x-1)(x+2)}}$$



Pr. 2: Určte definičný obor funkcie:

$f: y = \sqrt{\frac{x}{x-3}} + \log_8(\sqrt{x+1})$

D(f) = $(-1, 0\rangle \cup (3, \infty)$

Pr. 3: Určte definičný obor funkcie:

$$f: y = \log_5[(x-1)(x+3)] + \sqrt{\frac{1}{x-3}}$$

D(f) = (3,∞)

z podmienky pre odmocninu: $\frac{1}{x-3} \geq 0$

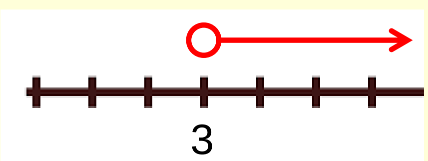
z podmienky pre zlomok: $x - 3 \neq 0$

$$\frac{1}{x-3} > 0 \rightarrow x - 3 > 0$$

z podmienky pre logaritmus: $(x-1)(x+3) > 0$

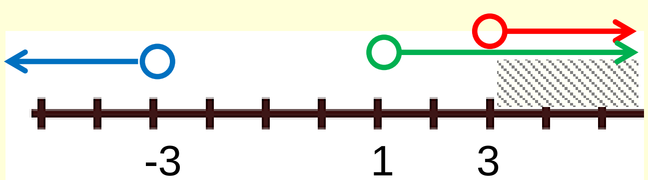
$$x - 3 > 0 \wedge (x-1)(x+3) > 0 \rightarrow$$

$$x > 3$$



$K_1 = (3, \infty)$

$D(f) = K_1 \cap K_2 = (3, \infty)$

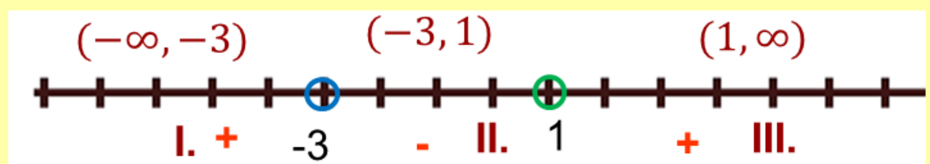


Intervalová metóda:

1. určíme nulové body (NB)

   $x - 1 = 0, \; x + 3 = 0$ NB: - 3; 1

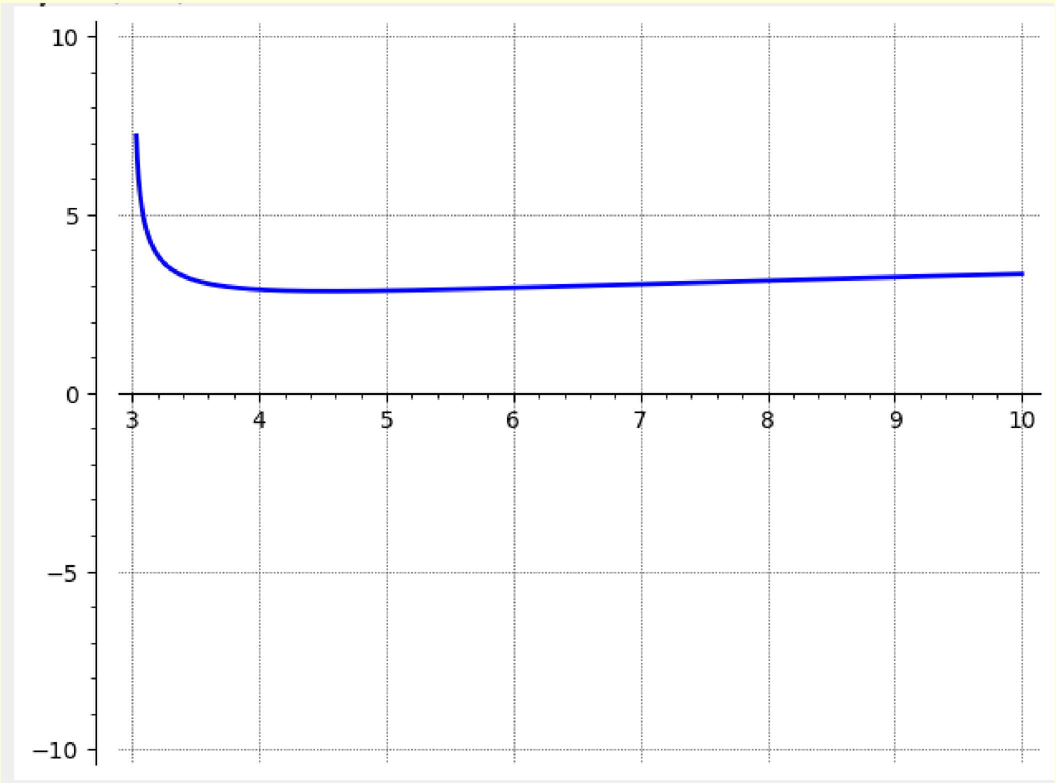
2. rozdelíme číselnú os na intervaly pomocou NB



3. na každom intervale určíme znamienko výrazu $(x-1)(x+3)$

výsledkom sú intervaly, kde bude súčin zátvoriek > 0, kde je výsledné znamienko +

$K_2 = (-\infty, -3) \cup (1, \infty)$



10
5
0
−5
−10
3
4
5
6
7
8
9
10

Pr. 4: Určte definičný obor funkcie:

$f: y = \sqrt{x^2 - 16} + \arcsin(x + 4) + \sqrt[9]{x}$ D(f) = $\langle -5, -4 \rangle$

Pr. 5: Určte definičný obor funkcie:

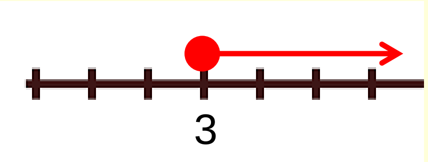
$f: y = \arccos\left(\frac{2x+3}{11}\right) + \sqrt[6]{x-3}$ D(f) = $\langle 3, 4\rangle$

z podmienky pre odmocninu: $x - 3 \geq 0$

z podmienky pre arccos: $-1 \leq \frac{2x+3}{11} \leq 1$

$$-1 \leq \frac{2x+3}{11} \quad \wedge \quad \frac{2x+3}{11} \leq 1 \quad \wedge \quad x - 3 \geq 0$$

$x \geq 3$



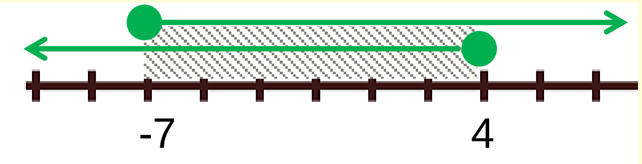
$K_2 = \langle 3, \infty)$

$-11 \leq 2x + 3$ $\qquad$ $2x + 3 \leq 11$

$-11 - 3 \leq 2x$ $\qquad$ $2x \leq 11 - 3$

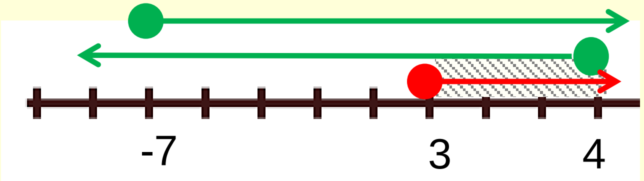
$-14 \leq 2x$ $\qquad$ $2x \leq 8$

$-7 \leq x$ $\qquad$ $x \leq 4$



$K_1 = \langle -7, 4\rangle$

$D(f) = K_1 \cap K_2 = \langle 3, 4\rangle$



Pr. 6: Určte definičný obor funkcie:

$f: y = \log_{\frac{1}{3}} \sqrt{x^2 - x - 2} + \sqrt[6]{\log_4 \frac{2x}{x-1}}$

D(f) = $(-\infty, -1) \cup (2, \infty)$

Pr. 7- str. 7 / 24: Určte definičný obor funkcie:

23.	$f: y=\sqrt{\log_2 \frac{3}{x-3}}$	$\langle 3, 6)$
24.	$f: y=\sqrt{\log_2 \frac{3x}{x-3}}$	$\left(-\infty, -\frac{3}{2}\right\rangle \cup (3, \infty)$

z podmienky pre odmocninu: $\log_2 \frac{3x}{x-3} \geq 0$

z podmienky pre logaritmus: $ak\ a = 2 > 1 \rightarrow \log_2 \frac{3x}{x-3} \geq 0 \Leftrightarrow \frac{3x}{x-3} \geq 1$

z podmienky pre zlomok: $x - 3 \neq 0$

$$\frac{3x}{x-3} \geq 1 \quad \wedge \quad x - 3 \neq 0$$

$$x \neq 3$$

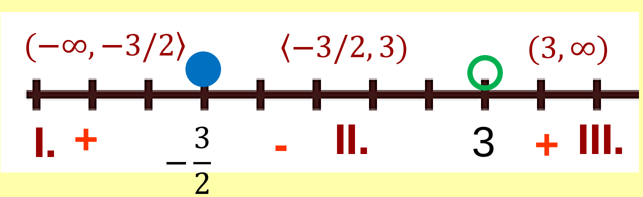
$$\frac{3x}{x-3} - 1 \geq 0$$

$$\frac{3x - x + 3}{x-3} \geq 0$$

$$\frac{2x+3}{x-3} \geq 0$$

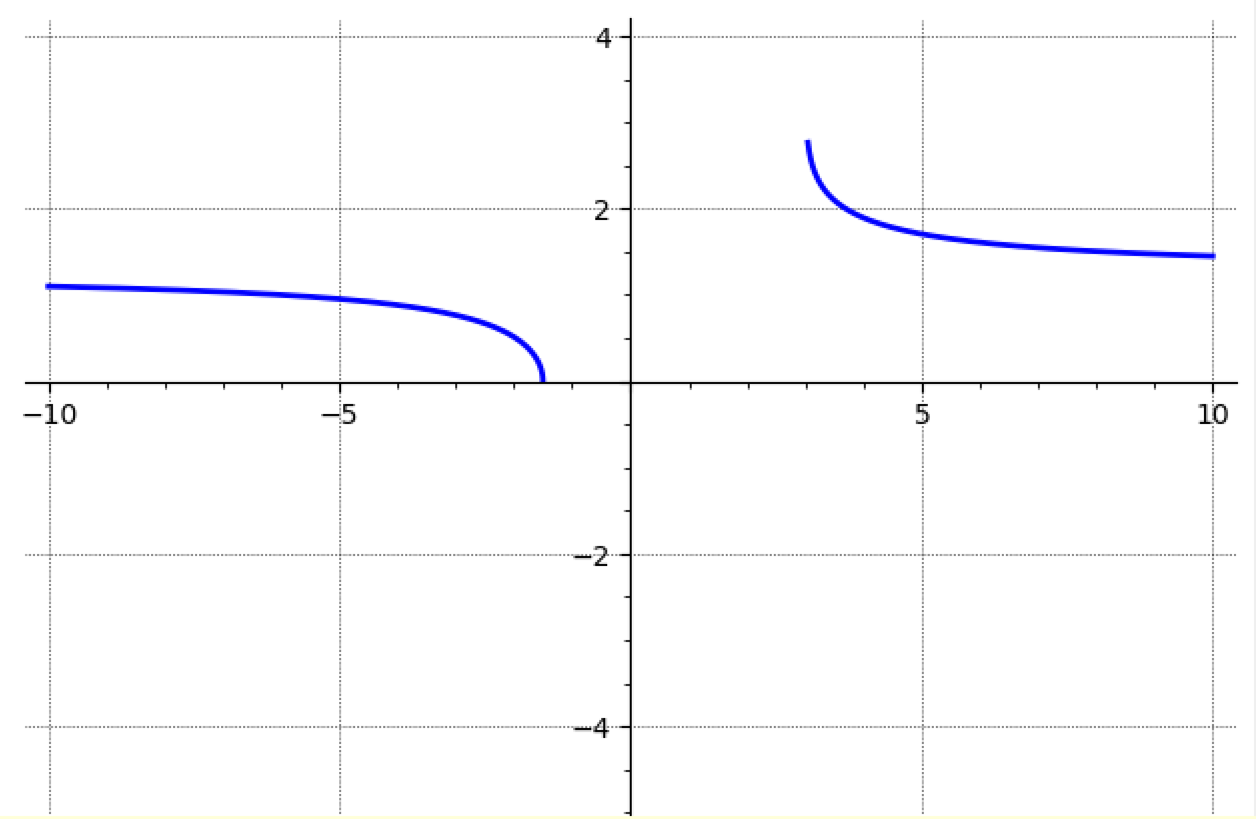
Intervalová metóda:

NB: $-\frac{3}{2}, 3$



$D(f) = (-\infty, -3/2\rangle \cup (3, \infty)$

$D_f = (-\infty, -\frac{3}{2}\rangle \cup (3, \infty)$



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