Václav Alt
alt.vaclav@gmail.com
Teams

web: vaclav-alt.github.io
heslo: nemamradlekorici

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2 testy

PT: 80b. 60% = 120b.
ZT: 120b.
PT: 30.3. 17:30 úterý
10.4. 9:00 sobota

2h

Obsah: Množiny, vlastnosti čísel, rovnice a nerovnice, grafy funkcí
rámcově po Lin a kvadr. fce (včetně)

$$S = 2000\ m^2$$

S_a, S_b

$$\frac{S_b}{S_a} = \frac{3}{2}$$

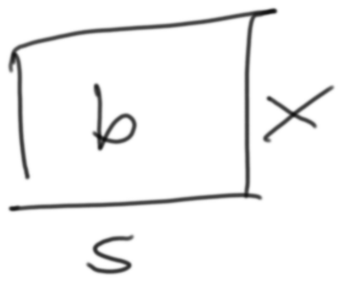
$$s = r + 10$$

$$S_a + S_b = S$$

$$r + s = y$$

$$S_a = x \cdot r$$

$$S_b = x \cdot s$$



$$\frac{s}{x} = ?$$

$$S = x \cdot y = x \cdot (r+s) = x \cdot (r+r+10)$$

$$= x \cdot (2r+10)$$

$$S_a = x \cdot r$$

$$S_b = x \cdot s = x \cdot (r+10)$$

$$\frac{S_b}{S_a} = \frac{x(r+10)}{x \cdot r} = \left| \frac{r+10}{r} = \frac{3}{2} \right| \quad / \cdot r$$

$$r + 10 = \frac{3}{2} r \quad / \cdot 2$$

$$2r + 20 = 3r$$

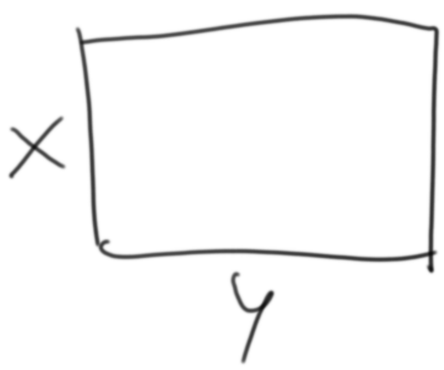
$$\boxed{r = 20}$$

$$s = r + 10$$

$$\boxed{s = 30}$$

$$y = r + s$$

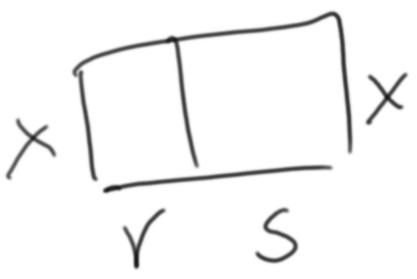
$$y = 20 + 30 = 50\ m$$



$$S = 2000\ m^2 = x \cdot y \quad \Rightarrow \quad x = \frac{S}{y} = \frac{2000}{50} = 40\ m$$

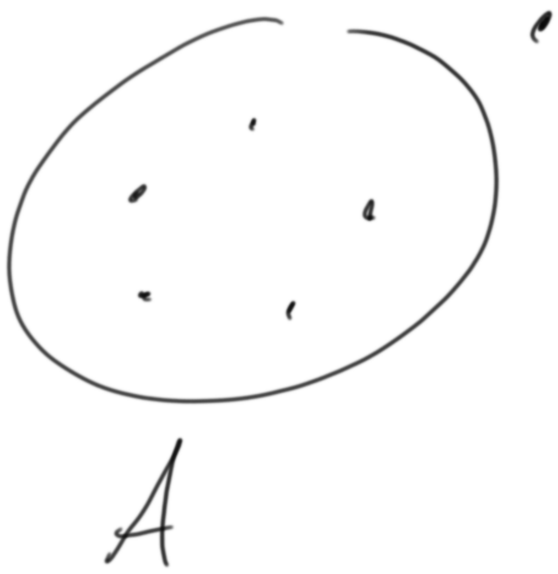
$$x = \frac{S}{y} = \frac{2000\ m^2}{50\ m} = \frac{2000}{50} \cdot \frac{m \cdot m}{m}$$

$$\boxed{x = 40\ m}$$



$$\frac{s}{x} = \frac{30}{40} = \frac{3}{4}$$

Zobrazení a množiny



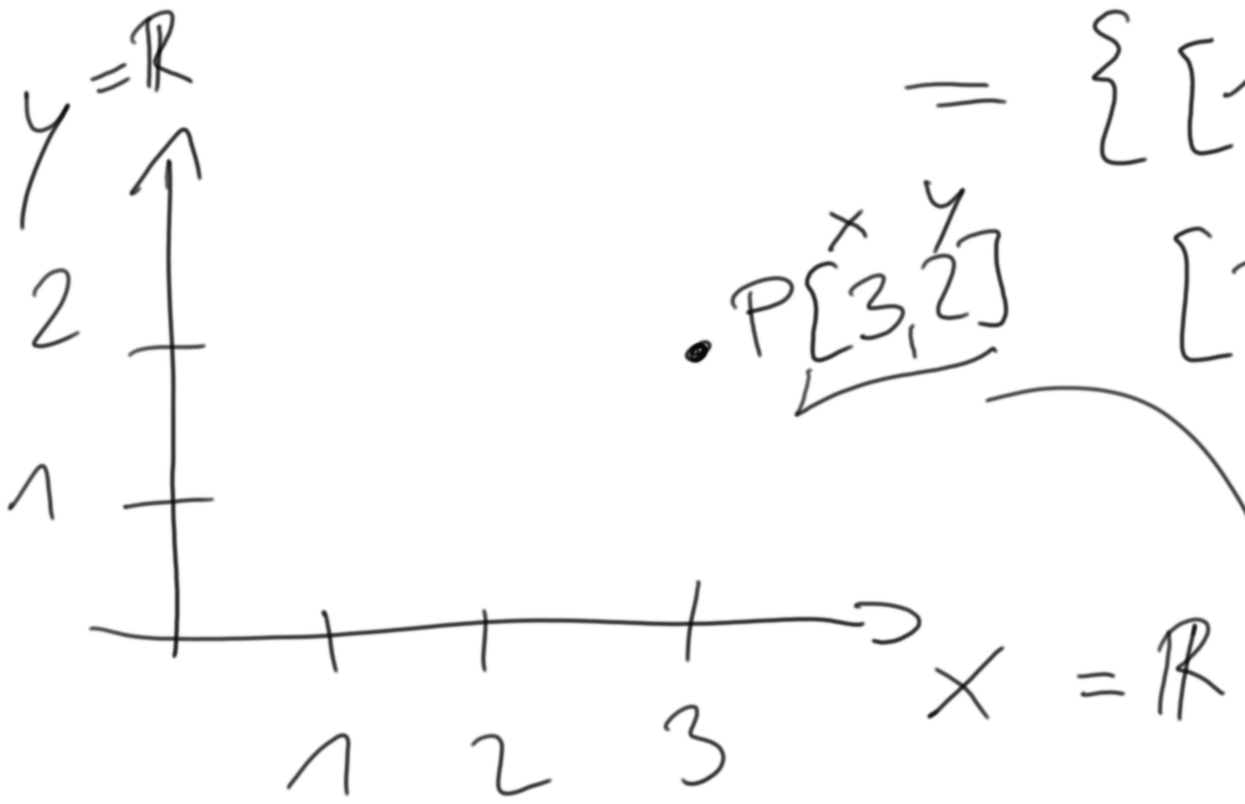
Kartézský součin

$A = \{1, 2\}$

$B = \{3, 4\}$

$A \times B = \{[a,b] : a \in A \wedge b \in B\}$

$= \{[1,3], [1,4], [2,3], [2,4]\}$



$\mathbb{R} \times \mathbb{R} = \mathbb{R}^2$

→ uspořádaná dvojice $\in \mathbb{R}^2$

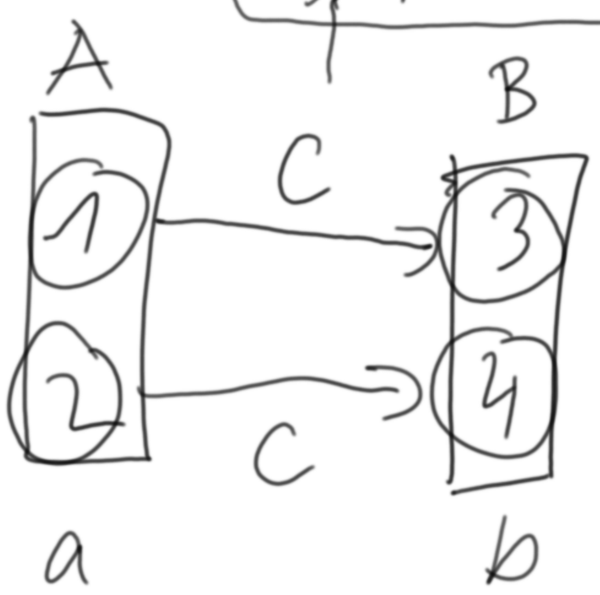
$A \times B$, $C \subset A \times B$

Př. $C = \{[1,3], [2,4]\}$

Zobrazení F z A do B, $F: A \to B$,

podmnožina $A \times B$:

$[a, b_1], [a, b_2] \in F \Rightarrow b_1 = b_2$



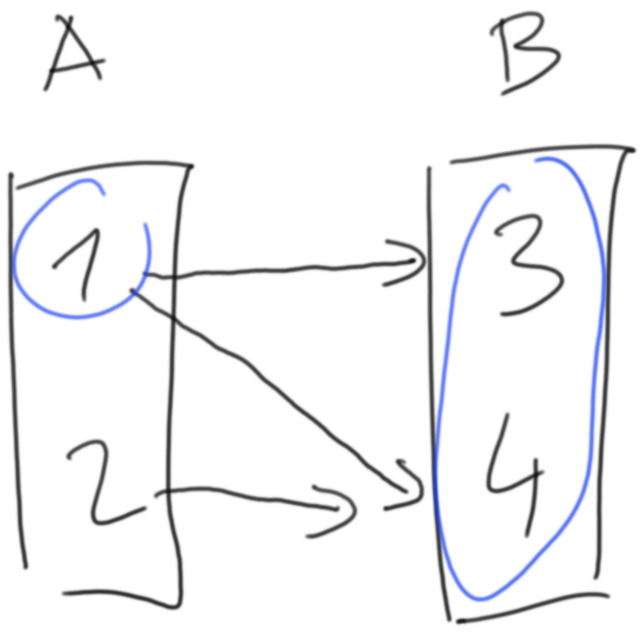
$[1,3]$

$[2,4]$

C je zobrazení

$$A \times B = \{[1,3], [1,4], [2,3], [2,4]\}$$

$$\underline{G} \subset A \times B = \{[1,3], [1,4], [2,3]\}$$



$[a, b_1], [a, b_2] \in G$ (1 3, 1 4)

$\Rightarrow b_1 = b_2$ definice zobrazení

$3 \neq 4$

$\Rightarrow$ G není ~~zobra~~ zobrazení

a ... "vzor"

b ... "obraz"

Zobrazení jednomu vzoru (a) přiřadí právě jeden obraz. důležité

A, B jsou číselné množiny : zobrazení → "funkce"

Množiny

Určete $K \cup M$, $L \cap K$, $L \setminus M$

1. $K = \langle 0, 5 \rangle$, $L = \langle \pi, 2\pi \rangle$, $M = \mathbb{R}^+$

$(a,b) = \{x \in \mathbb{R} \mid a < x < b\}$

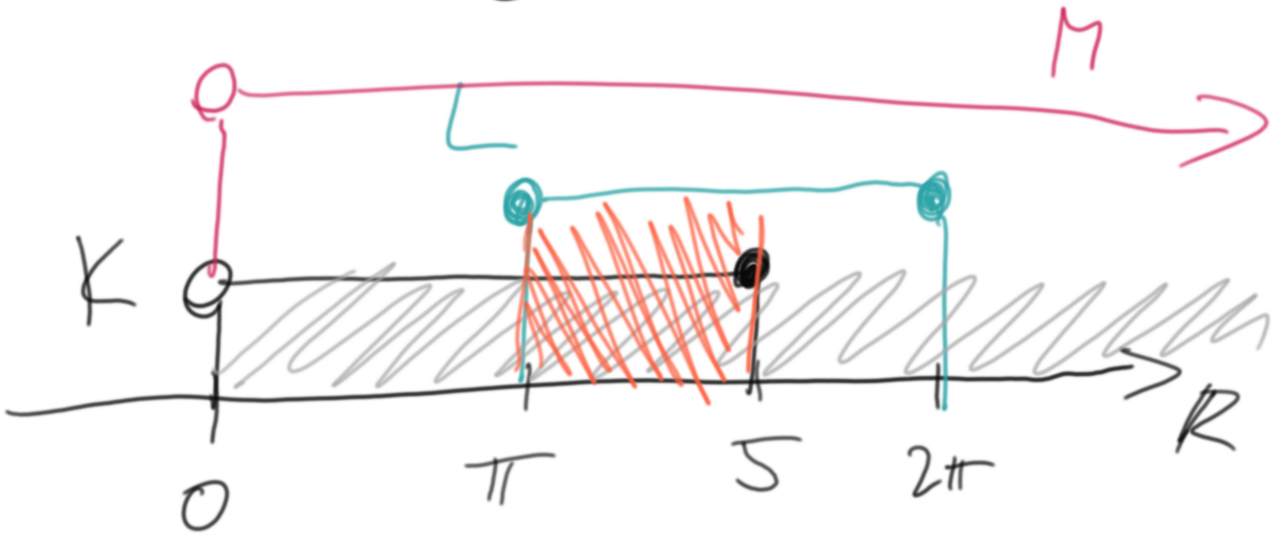
$[a,b] = \{x \in \mathbb{R} \mid a \leq x \leq b\}$

$\langle \quad \rangle$

$\mathbb{R}$ blackboard bold reálná čísla

R $\mathcal{R}$ $\boldsymbol{R}$

$\mathbb{R}^+ = \{x \in \mathbb{R} : x > 0\}$ $\mathbb{R}_0^+ = \mathbb{R}^+ \cup \{0\}$



$\pi = 3{,}1415926\ldots$

$K \cup M = (0, \infty) = \mathbb{R}^+ = M$

$K \cap L = \langle \pi, 5 \rangle$

$L \setminus M = \{\} = \emptyset$

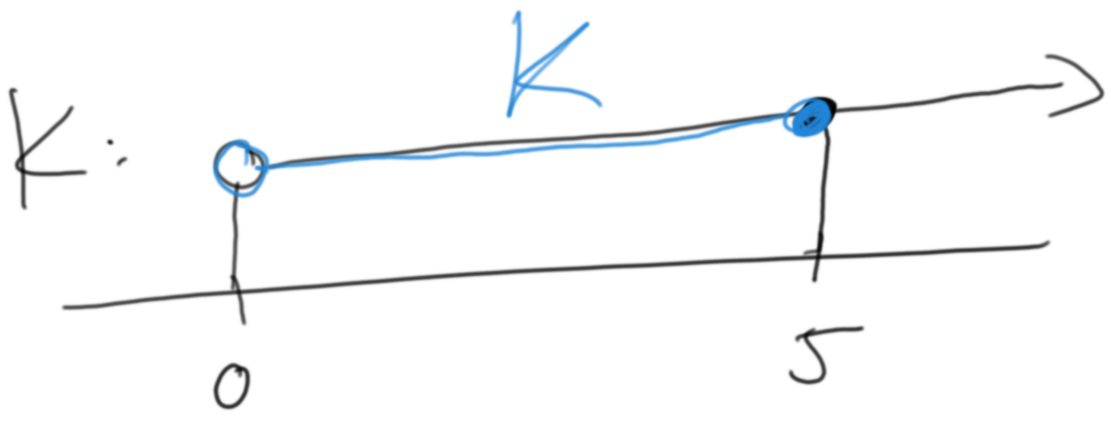
$\{\emptyset\}$ takhle se to nepíše

$K \cup M$, $L \cap K$, $L \setminus M$

$K = \{x \in \mathbb{R}^+ : |x| \leq 5\} = \langle 0, 5 \rangle$

$L = (-5, 5)$

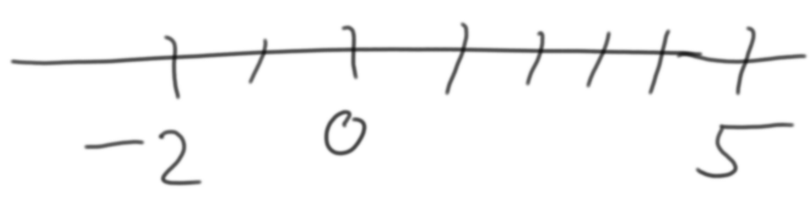
$M = \mathbb{R}^+$



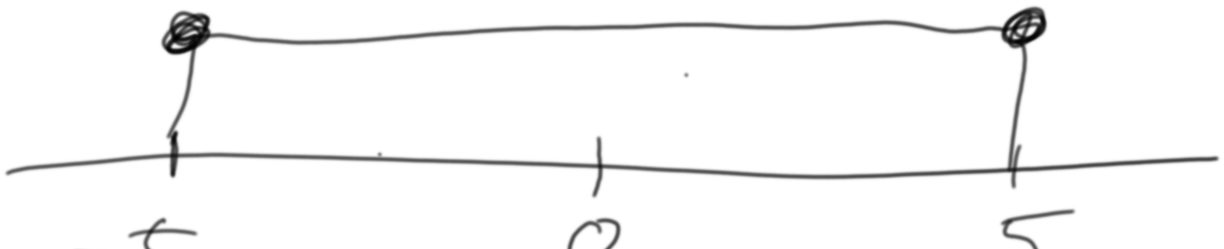
abs. hodnota:

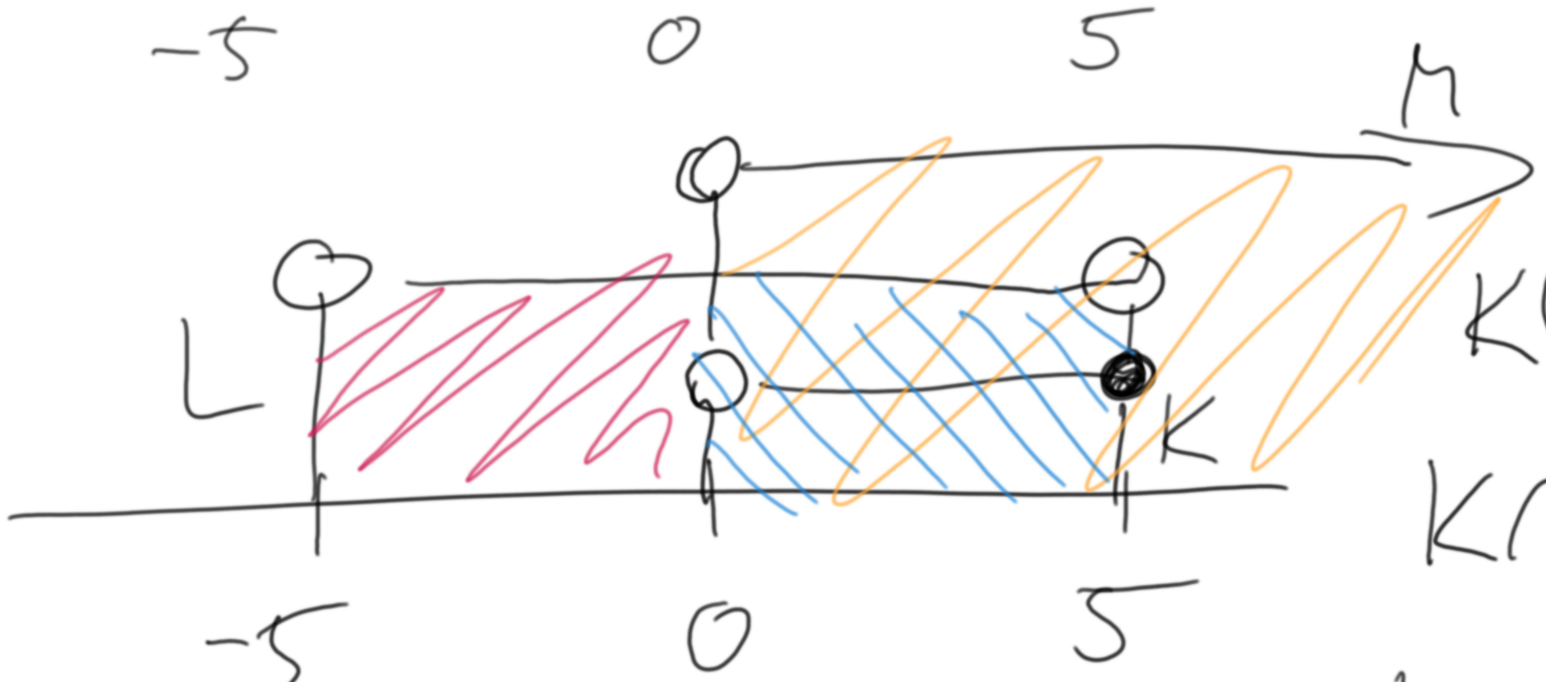
$$|x| = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

$|5| = 5$, $|-2| = 2$



$S = \{x \in \mathbb{R} : |x| \leq 5\}$





$K \cup M = \langle 0, \infty) = \mathbb{R}^+ = M$

$K \cap L = (0, 5)$

$L \setminus M = (-5, 0\rangle$

Otevřený interval (a, b) $\quad \langle 0, b), (-\infty, \infty)$

neobsahuje a ani b

Uzavřený interval $\langle a, b \rangle$ $[a, b]$

$(0, 5)$ $\quad [\langle$ obsahuje a i b

$(\langle a, b)$ obsahuje a, ale ne b

$K \cup M$, $L \cap K$, $K \setminus M$

$K = \{n \in \mathbb{N} : n \mid 30\}$, $L = \{2, 3, 4, 5\}$

$M = \{n \in \mathbb{N} : n \mid 25\}$

$a \mid b$: "a dělí b"

$\Leftrightarrow \exists c \in \mathbb{N} : \; b = a \cdot c$

$3 \mid 6$, protože $\exists c \; (c = 2)$

$6 = 2 \cdot 3$

$\mathbb{R} \longrightarrow \mathbb{R}$

$\mathbb{N} \longrightarrow \mathbb{N}$
přirozená čísla

$\mathbb{Q}$, $\mathbb{Z}$

$K = \{1, 2, 3, 5, 6, 10, 15, 30\}$

$L = \{2, 3, 4, 5\}$ $M = \{1, 5, 25\}$

$K \cup M = \{1, 2, 3, 5, 6, 10, 15, 25, 30\}$

$L \cap K = \{2, 3, 5\}$ $K \setminus M = \{2, 3, 6, 10, 15, 30\}$

Sbírka úloh:
Petáková: Příprava k maturitě