

**Izjave in množice: zbirka nalog + rešeni primeri**

1. Ob pomoči pravilnostnih tabel ugotovi, kdaj so sestavljene izjave pravilne in kdaj nepravilne.

- (a)  $A \wedge \neg B$
- (b)  $\neg(\neg A \vee B)$
- (c)  $\neg A \vee \neg B$
- (d)  $A \Rightarrow (A \wedge B)$
- (e)  $(A \vee B) \Leftrightarrow \neg A$
- (f)  $(A \wedge B) \Rightarrow (B \wedge C)$

a)

A	B	$\neg B$	$A \wedge \neg B$
p	p	n	n
p	n	p	p
n	p	n	n
n	n	p	n

d)

A	B	$A \wedge B$	$A \Rightarrow (A \wedge B)$
p	p	p	p
p	n	n	n
n	p	n	p
n	n	n	p

e)

A	B	$A \vee B$	$\neg A$	$(A \vee B) \Leftrightarrow \neg A$
p	p	p	n	n
p	n	p	n	n
n	p	p	p	p
n	n	n	p	n

2. Preveri pravilnost sklepov.

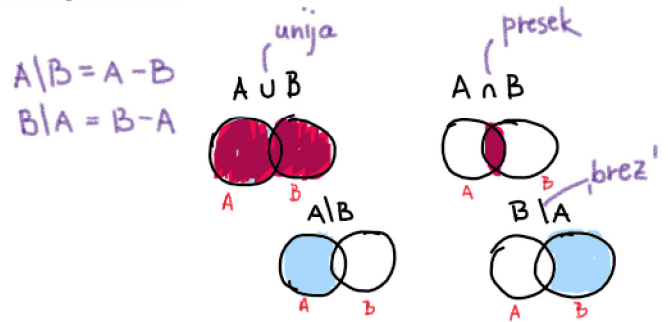
- (a) Šel bom na tekmo. Zvečer bom napisal nalogo.  
Naloge ne bom uspel napisati natanko tedaj, če bom šel na tekmo in potem še v kino. Če grem na tekmo in potem še v kino, ne bom utegnil napisati naloge.
- (b) Jutri bo lep sončen dan. Pospraviti moram stanovanje in kupiti mami darilo za rojstni dan.  
Če bo jutri deževalo, potem bom kupil mami darilo za rojstni dan ali pa ne bom pospravil stanovanja.

3. Univarzalna množica naj bo množica naravnih števil, manjših od 20. Zapiši naslednje množice z elementi.

$$A = \{n \mid n = 4k \wedge k \in \mathbb{N}\}$$

$$B = \{n \mid 3n + 8 < 30\}$$

$$C = \{n \mid n \geq 10 \wedge n \text{ je sodo število}\}$$



4. Dane so množice

$$A = \{n \mid n \in \mathbb{N} \wedge 2 \leq n < 10\}$$

$$B = \{2n - 1 \mid n \in \mathbb{N} \wedge 3 \leq n \leq 8\}$$

$$C = \{3n \mid n \in \mathbb{N} \wedge 1 \leq n \leq 7\}$$

- (a) Zapiši elemente množic A, B in C.
- (b) Zapiši še elemente množic  $B \cap C$ ,  $C \setminus A$  in  $(A \cup C) \setminus B$ .

- 2. b) A: Jutri bo lep sončen dan.  $\neg A$ : Jutri bo deževalo.
- B: Pospravil bom stanovanje.  $\neg B$ : Ne bom pospravil.
- C: Mami bom kupil darilo za rojstni dan.

Sklep:  $\neg A \Rightarrow (C \vee \neg B)$

A	B	C	$\neg A$	$\neg B$	$C \vee \neg B$	$\neg A \Rightarrow (C \vee \neg B)$
p	p	p	n	n	p	p
p	p	n	n	n	n	p
p	n	p	n	p	p	p
p	n	n	n	p	p	p
n	p	p	p	n	p	p
n	p	n	p	n	n	n
n	n	p	p	p	p	p
n	n	n	p	p	p	p

$$A = \{n \mid n \in \mathbb{N} \wedge 2 \leq n < 10\}$$

$$B = \{2n - 1 \mid n \in \mathbb{N} \wedge 3 \leq n \leq 8\}$$

$$C = \{3n \mid n \in \mathbb{N} \wedge 1 \leq n \leq 7\}$$

a) Zapiši elemente množic A, B in C

$$A = \{2, 3, 4, 5, 6, 7, 8, 9\}$$

$$B = \{5, 7, 9, 11, 13, 15\}$$

$$\text{vstavi } \begin{cases} n = 3, 4, 5, 6, 7, 8 \\ 2n - 1 = 5, 7, 9, 11, 13, 15 \end{cases}$$

$$C = \{3, 6, 9, 12, 15, 18, 21\}$$

$$\text{vstavi } \begin{cases} n = 1, 2, 3, 4, 5, 6, 7 \\ 3n = 3, 6, 9, 12, 15, 18, 21 \end{cases}$$

b)

$$B \cap C = \{9, 15\}$$

$$C \setminus A = \{12, 15, 18, 21\}$$

$$A \cup C = \{2, 3, 4, 5, 6, 7, 8, 9, 12, 15, 18, 21\}$$

$$(A \cup C) \setminus B = \{2, 3, 4, 6, 8, 12, 18, 21\}$$

5. Določi množici  $(A \cup B) \cap (A \cup C)$  ter  $(A \cap B) \cap C$ , če so

$$\begin{aligned} A &= \{x \in \mathbb{R} \mid 0 < x < 2\} \\ B &= \{x \in \mathbb{R} \mid 1 < x \leq 5\} \\ C &= \{x \in \mathbb{R} \mid 4 \leq x \leq 10\} \end{aligned}$$

6. Dane so množice

$$\begin{aligned} A &= \{x \in \mathbb{R} \mid x^3 + x^2 - 2x = 0\} \\ B &= \{x \in \mathbb{R} \mid e^{x^2 - x} = 1 \vee x - 3 = 0\} \\ C &= \{x \in \mathbb{R} \mid \log_x 9 = 2 \vee x^3 - x^2 + x - 1 = 0 \vee 5 - x = 0\} \end{aligned}$$

a) Zapiši elemente množic A, B in C.

b) Zapiši še elemente množic  $A \cup B$ ,  $A \cap B$ ,  $A \setminus B$ ,  $(A \setminus C) \cup B$ ,  $(A \cup B \cup C) \setminus (B \cap C)$ ,  $(A \setminus B) \setminus (C \cup A)$ .

c) Za konec zapiši še elemente množice  $A \times B$  in  $B \times A$ .

7. Dane so množice

$$\begin{aligned} A &= \left\{x \in \mathbb{R} \mid 4^x = 2^{\frac{x+1}{x}}\right\} \\ B &= \{x \in \mathbb{R} \mid \log(2x+3) + \log(3x-1) = \log x + \log(6x+2)\} \end{aligned}$$

(a) Zapiši elemente množic A in B.

(b) Zapiši še elemente množic  $A \cup B$ ,  $A \cap B$ ,  $A \setminus B$  in  $B \setminus A$ .

6. a)  $A = \{x \in \mathbb{R} \mid x^3 + x^2 - 2x = 0\}$

$$\begin{aligned} x^3 + x^2 - 2x &= 0 \\ x(x^2 + x - 2) &= 0 \\ x(x+2)(x-1) &= 0 \end{aligned}$$

$x_1 = 0 \quad x_2 = -2 \quad x_3 = 1 \quad A = \{-2, 0, 1\}$

$B = \{x \in \mathbb{R} \mid \underbrace{e^{x^2-x} = 1}_{\text{ali}} \vee \underbrace{x-3=0}_{x_3=3}\}$

$$e^{x^2-x} = 1$$

$$e^{x^2-x} = e^0$$

$$x^2 - x = 0$$

$$x(x-1) = 0$$

$x_1 = 0 \quad x_2 = 1$

$B = \{0, 1, 3\}$

$C = \{x \in \mathbb{R} \mid \log_x 9 = 2 \vee \underbrace{x^3 - x^2 + x - 1 = 0}_{\text{ne bo nikoli 0}} \vee \underbrace{5-x=0}_{x_4=5}\}$

$$x^2 = 9$$

$$x = \pm \sqrt{9}$$

$$x = \pm 3$$

$x_1 = 3 \quad x_2 = -3$

$$x^2(x-1) + 1 \cdot (x-1) = 0$$

$$(x^2+1) \cdot (x-1) = 0$$

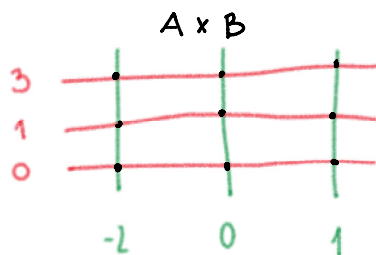
ne bo nikoli 0

$x_3 = 1$

$C = \{-3, 1, 3, 5\}$

c)  $A \times B = \{(-2, 0), (-2, 1), (-2, 3), (0, 0), (0, 1), (0, 3), (1, 0), (1, 1), (1, 3)\}$

$B \times A = \{(0, -2), (1, -2), (3, -2), (0, 0), (1, 0), (3, 0), (0, 1), (1, 1), (3, 1)\}$



8. Zapiši elemente množic

$$A = \{x \in \mathbb{R} \mid 2x < x+1 < 2x-1\}$$

$$B = \left\{x \in \mathbb{R} \mid \frac{x-4}{x+1} \geq 0\right\}$$

9. Dane so množice

$$A = \{x \in \mathbb{R} \mid (x-1)^2 < x(x-2) + 3 \vee 3x-5 < x+3 < 2x+4\}$$

$$B = \{x \in \mathbb{R} \mid -3 < x^2 - 3x - 1 > 3\}$$

- (a) Zapiši elemente množic  $A$  in  $B$ .  
 (b) Zapiši še elemente množic  $A \cup B$ ,  $A \cap B$ ,  $A \setminus B$  in  $B \setminus A$ .

10. Naj bo

$$A = \left\{x \in \mathbb{R} \mid \frac{x+1}{x-5} < 3\right\}$$

$$B = \{x \in \mathbb{R} \mid x^3 - 5x^2 > 0 \vee x-1 \leq 0\}$$

Določi  $A^C$ ,  $B^C$ ,  $(A \cap B)^C$  in  $(A \setminus B)^C$ .

10.  $A = \left\{x \in \mathbb{R} \mid \frac{x+1}{x-5} < 3\right\} = \{x \in (-\infty, 5) \cup (8, \infty)\}$

$B = \{x \in \mathbb{R} \mid x^3 - 5x^2 > 0 \vee x-1 \leq 0\} = \{x \in (-\infty, 1] \cup (5, \infty)\}$

$U = \mathbb{R}$  (univerzalna množica  
so vsa realna števila)

ali '(unija')

$$\frac{x+1}{x-5} < 3$$

$$x^3 - 5x^2 > 0$$

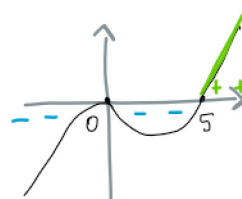
$$x-1 \leq 0$$

$$\frac{x+1}{x-5} - 3 < 0$$

$$x^2(x-5) > 0$$

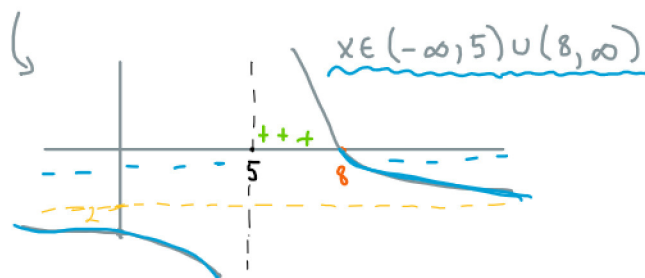
$$x \leq 1$$

$$\frac{x+1}{x-5} - \frac{3(x-5)}{x-5} < 0$$



$$\frac{x+1-3x+15}{x-5} < 0$$

$$\frac{-2x+16}{x-5} < 0$$



$$A^C = \{x \in [5, \infty)\}$$

$$B^C = \{x \in (1, 5]\}$$

$$A \cap B = \{x \in (-\infty, 1] \cup (8, \infty)\}$$

$$(A \cap B)^C = \{x \in (1, 8]\}$$

$$A \setminus B = \{x \in (1, 5)\}$$

$$(A \setminus B)^C = \{x \in (-\infty, 1] \cup [5, \infty)\}$$

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