

# 1. feladatsor – Halmazok

## Megoldások

### 1. Feladat.

- $A \cup B = \{a, b, c, d, e\} = U$ ;
- $A \cap B = \{d\}$ ;
- $\overline{B} = \{a, b, c\}$ ;
- $A \setminus B = \{a, b, c\}$ ;
- $A \Delta B = \{a, b, c, e\}$ ;
- $(A \Delta \overline{C}) \setminus \overline{B} = \emptyset$ ;
- $\mathcal{P}(B) = \{\emptyset, \{d\}, \{e\}, \{d, e\}\}$ .

### 2. Feladat. $A = \{\emptyset, \{a\}, \{b\}, \{a, b\}\}$ , $B = \{\emptyset, \{b\}, \{c\}, \{b, c\}\}$

- $A \cup B = \{\emptyset, \{a\}, \{b\}, \{c\}, \{a, b\}, \{b, c\}\}$ ;
- $A \cap B = \{\emptyset, \{b\}\}$ ;
- $A \setminus B = \{\{a\}, \{a, b\}\}$ ;
- $B \setminus A = \{\{c\}, \{b, c\}\}$ ;
- $A \Delta B = \{\{a\}, \{c\}, \{a, b\}, \{b, c\}\}$ .

### 3. Feladat.

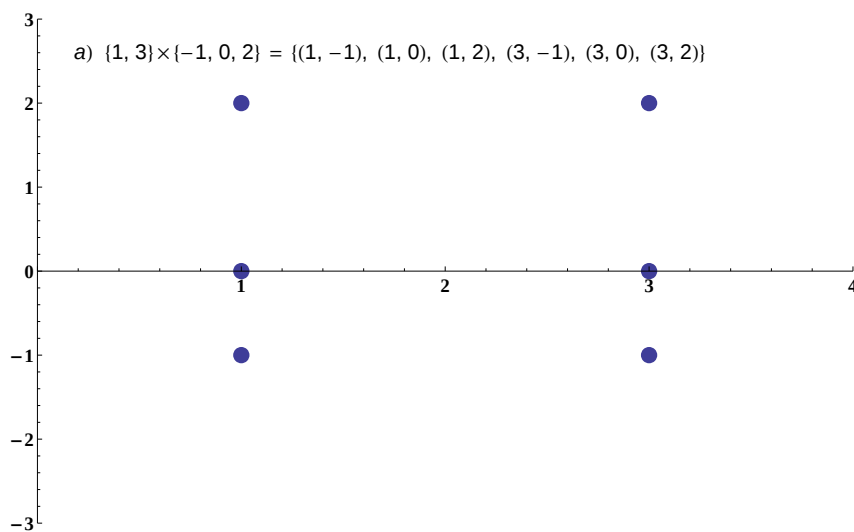
- |                            |                                |                                    |                                               |
|----------------------------|--------------------------------|------------------------------------|-----------------------------------------------|
| a) $\emptyset \in A$       | c) $\{\emptyset\} \in A$       | e) $\{\{\emptyset\}\} \notin A$    | g) $\{\{\emptyset\}, \emptyset\} \in A$       |
| b) $\emptyset \subseteq A$ | d) $\{\emptyset\} \subseteq A$ | f) $\{\{\emptyset\}\} \subseteq A$ | h) $\{\{\emptyset\}, \emptyset\} \subseteq A$ |

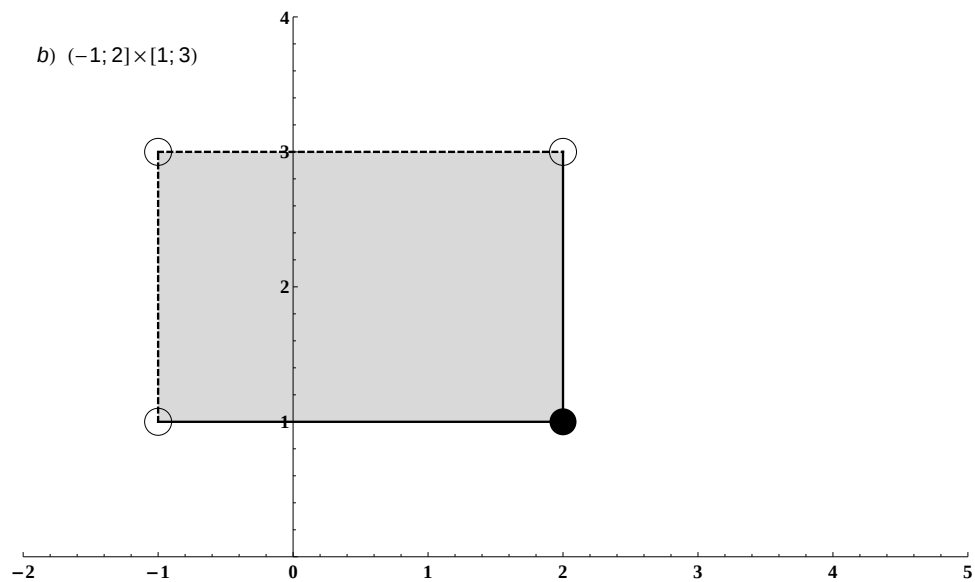
### 4. Feladat. $\mathcal{P}(\mathcal{P}(\emptyset)) = \{\emptyset, \{\emptyset\}\}$

### 5. Feladat.

- |                                                                   |                                                               |
|-------------------------------------------------------------------|---------------------------------------------------------------|
| a) $A \setminus (B \setminus C) \neq (A \setminus B) \setminus C$ | e) $A = (A \cup B) \setminus (B \setminus A)$                 |
| b) $(A \setminus B) \setminus B = A \setminus B$                  | f) $(A \cap B) \setminus (B \setminus (A \cup C)) = A \cap B$ |
| c) $A \cap (B \cup C) \neq (A \cup B) \cap (A \cup C)$            | g) $(A \Delta B) \Delta (A \cap B) = A \cup B$                |
| d) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$               |                                                               |

### 6. Feladat.





7. Feladat.  $\overline{A \cup (B \cap (C \cup D))} = \overline{A} \cap (\overline{B} \cup (\overline{C} \cap \overline{D}))$

8. Feladat.  $A \subseteq B$  teljesül,  $A = B$  és  $B \setminus A = \emptyset$  nem teljesül.

9. Feladat.

a)

$$\begin{aligned}
 x \in (A \cap C) \cup (B \cap D) &\iff x \in (A \cup (B \cap D)) \cap (C \cup (B \cap D)) \\
 &\iff x \in (A \cup B) \cap (A \cup D) \cap (C \cup B) \cap (C \cup D) \\
 &\implies x \in (A \cup B) \cap (C \cup D)
 \end{aligned}$$

b)

$$\begin{aligned}
 x \in C \cup D &\implies x \notin B \cap \overline{(C \cup D)} = B \setminus (C \cup D) \\
 &\nearrow \\
 x \in A \cap C \cap D & \\
 &\searrow \\
 &x \in A \cap C \\
 &\implies x \in (A \cap C) \setminus (B \setminus (C \cup D))
 \end{aligned}$$

10. Feladat.

- $A \cap A = \overline{\overline{A \cap A}} = \overline{\overline{A}}$
- $(A \cap B) \cap (A \cap B) = \overline{\overline{A \cap B}} = \overline{\overline{A \cap B}} = A \cap B$
- $A \cup B = (A \cap A) \cap (B \cap B)$