

Sets

Set of all Sets

Ready, set, go!

1 Problem – Sets of natural numbers

Sets A , B and C contain following elements:

$$A = \{9, 16, 17, 18, 23, 24\}$$

$$B = \{3, 8, 11, 17, 18, 20, 25\}$$

$$C = \{3, 8, 13, 16, 17, 19, 24, 25\}$$

Determine:

- the union $A \cup B$,
- the union $B \cup C$,
- the union $A \cup B \cup C$,
- the difference $A \setminus B$,
- the difference $B \setminus C$,
- the difference $A \setminus C$,
- the intersection (common part) $A \cap B$,
- the intersection $B \cap C$,
- the intersection $A \cap C$,
- the intersection $A \cap B \cap C$.

Answer:

- $A \cup B = \{3, 8, 9, 11, 16, 17, 18, 20, 23, 24, 25\}$
- $B \cup C = \{3, 8, 11, 13, 16, 17, 18, 19, 20, 24, 25\}$
- $A \cup B \cup C = \{3, 8, 9, 11, 13, 16, 17, 18, 19, 20, 23, 24, 25\}$
- $A \setminus B = \{9, 16, 23, 24\}$
- $B \setminus C = \{11, 18, 20\}$
- $A \setminus C = \{9, 18, 23\}$
- $A \cap B = \{17, 18\}$
- $B \cap C = \{3, 8, 17, 25\}$
- $A \cap C = \{16, 17, 24\}$
- $A \cap B \cap C = \{17\}$

2 Problem – Set operations

Simplify the following expressions with sets A and B :

- $(A \cup B) \setminus B$
- $A \cap (B \cup A)$
- $(A \cup B) \cap (B \setminus A)$
- $(A \cap B) \setminus B$

Answer:

- $A \setminus B$
- A

- c) $B \setminus A$
- d) $\{\}$

3 Problem – Set operations

Simplify the following expressions with sets A and B :

- a) $A \cap (B \cup A)$
- b) $(B \setminus A) \setminus A$
- c) $B \cap (B \setminus A)$
- d) $(B \cup B) \setminus A$

Answer:

- a) A
- b) $B \setminus A$
- c) $B \setminus A$
- d) $B \setminus A$