Name ....

row .... col....

1.	2.	3.	4.	5.	$\sum$

1. Write the mathematical formulas corresponding to the following statements with the help of the following signs only: propositional connectives, quantifiers, variables varied through set a) $\mathbb{N}$ b) $\mathbb{R}$ and symbols indicated in brackets

a) every divisor of an odd number is odd $(\cdot, +, 1, =)$

b) if linear equations has two different solutions then it has a third one. $(\cdot, +, 0, =)$

2. For $X_{a,b} = \{(x, y) \in \mathbb{R}^2 : y > ax^2, y < bx\}$ where $a, b \in \mathbb{R}$. Find:

$\bigcup_{b\in\mathbb{R}} X_{a,b}$

$\bigcap_{a\geq 0} \bigcup_{b\in\mathbb{R}} X_{a,b}$

$\bigcup_{a\in\mathbb{R}} X_{a,b}$

$\bigcap_{b\in\mathbb{R}} \bigcup_{a\in\mathbb{R}} X_{a,b}$

3. Prove or disprove

$\mathcal{P}(A \div B) \subseteq \mathcal{P}(A) \div \mathcal{P}(B)$

4. Are the following equalities true. Prove the true one, find a counterexample for the false one.

a) $A \div (C \cap B) = (A \setminus C) \cup (C \setminus (A \cap B)$

b) $A \div (C \cap B) = (C \cap B) \cup (A \setminus C)$

5. Is the following formula a tautology?

Transform it into CNF form (e.i. $(x_1 \vee x_2 \vee x_3) \wedge (..)... \wedge (...)$ where x_i are variable or their negations)

$[(p \Rightarrow q) \Rightarrow (q \Rightarrow r)] \Rightarrow (p \Rightarrow r)$

Name ....   row .... col....

1.	2.	3.	4.	5.	$\sum$

1. Write the mathematical formulas corresponding to the following statements with the help of the following signs only: propositional connectives, quantifiers, variables varied through set a) $\mathbb{N}$ b) $\mathbb{R}$ and symbols indicated in brackets

a) divisors of an even number are not necessary even $(\cdot, +, 1, =)$

b) a quadratic polynomial has at most three roots $(\cdot, +, 0, =)$

2. For $X_{a,b} = \{(x, y) \in \mathbb{R}^2 : y > ax^2, y < b(x-1)\}$ where $a, b \in \mathbb{R}$. Find:

$\bigcup_{b\in\mathbb{R}} X_{a,b}$

$\bigcap_{a\geq 0} \bigcup_{b\in\mathbb{R}} X_{a,b}$

$\bigcup_{a\in\mathbb{R}} X_{a,b}$

$\bigcap_{b\in\mathbb{R}} \bigcup_{a\in\mathbb{R}} X_{a,b}$

3. Prove or disprove

$\mathcal{P}(A \times B) \subseteq \{(X, Y) : X \subset A, Y \subset B\}$

4. Is the following formula a tautology?

Transform it into CNF form (e.i. $(x_1 \vee x_2 \vee x_3) \wedge (..)... \wedge (...)$ where x_i are variable or their negations)

$[(q \Rightarrow p) \Rightarrow (q \Rightarrow r)] \Rightarrow (p \Rightarrow r)$

5. Are the following equalities true. Prove the true one, find a counterexample for the false one.

a) $(A \cup B) \div (A \cap B \cap C) = [A \setminus (C \setminus B)] \cup [B \setminus (C \setminus A)]$

b) $(A \cup B) \div (A \cap B \cap C) = [A \setminus (C \cup B)] \cup [B \setminus (C \cup A)] \cup (A \cap B \cap C)$

Name .... row .... col....

1.	2.	3.	4.	5.	$\sum$

1. Write the mathematical formulas corresponding to the following statements with the help of the following signs only: propositional connectives, quantifiers, variables varied through set a) $\mathbb{N}$ b) $\mathbb{R}$ and symbols indicated in brackets

a) every number has the smallest prime divisor $(\cdot, +, 1, =)$

b) a quadratic polynomial with all coefficients positive has exactly one minimum. $(\cdot, +, 0, =, <)$

2. For $X_{a,b} = \{(x, y) \in \mathbb{R}^2 : y \leq ax^2, y > bx\}$ where $a, b \in \mathbb{R}$. Find:

$\bigcup_{b\in\mathbb{R}} X_{a,b}$

$\bigcup_{a\geq 0} \bigcup_{b\in\mathbb{R}} X_{a,b}$

$\bigcup_{a\in\mathbb{R}} X_{a,b}$

$\bigcap_{b\in\mathbb{R}} \bigcup_{a\in\mathbb{R}} X_{a,b}$

3. Prove or disprove

$\mathcal{P}(A) \subseteq \mathcal{P}(B) \Rightarrow A \subset B$

4. Are the following equalities true. Prove the true one, find a counterexample for the false one.

a) $C \div (B \setminus A) = (A \cap C) \cup [(B \cup C) \setminus (A \cup (B \cap C))]$

b) $C \div (B \setminus A) = B \div (C \setminus A)$

5. Is the following formula a tautology?

Transform it into CNF form (e.i. $(x_1 \vee x_2 \vee x_3) \wedge (..)... \wedge (...)$ where x_i are variable or their negations)

$[(p \Rightarrow q) \Rightarrow (q \Rightarrow r)] \Rightarrow (r \Rightarrow \sim p)$

Name .... row .... col....

1.	2.	3.	4.	5.	$\sum$

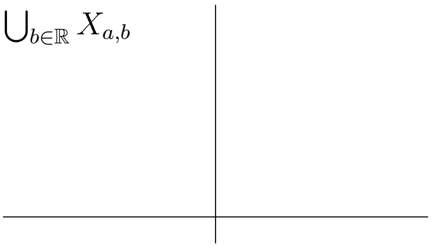
1. Write the mathematical formulas corresponding to the following statements with the help of the following signs only: propositional connectives, quantifiers, variables varied through set a) $\mathbb{N}$ b) $\mathbb{R}$ and symbols indicated in brackets

a) for every number there exists its largest odd divisor $(\cdot, +, 1, =)$

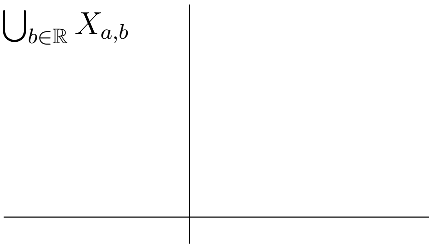
b) the set of values of any quadratic polynomial is bounded from below or above $(\cdot, +, 0, =, <)$

2. For $X_{a,b} = \{(x, y) \in \mathbb{R}^2 : y \leq ax^2, y > b(x-1)\}$ where $a, b \in \mathbb{R}$. Find:

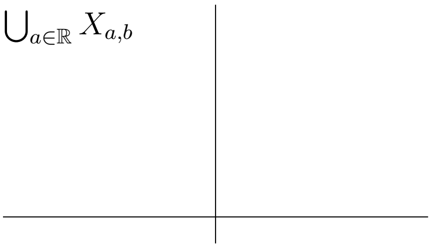
$\bigcup_{b\in\mathbb{R}} X_{a,b}$



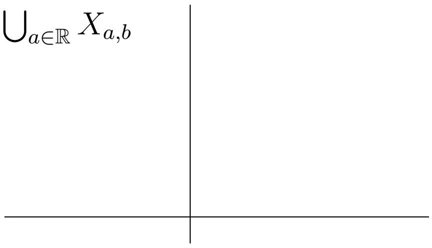
$\bigcup_{a\geq 0} \bigcup_{b\in\mathbb{R}} X_{a,b}$



$\bigcup_{a\in\mathbb{R}} X_{a,b}$



$\bigcap_{b\in\mathbb{R}} \bigcup_{a\in\mathbb{R}} X_{a,b}$



3. Prove or disprove

$\mathcal{P}(A \cup B) \cup \mathcal{P}(B \cup C) \cup \mathcal{P}(C \cup A) = A \cup B \cup C$

4. Is the following formula a tautology?

Transform it into CNF form (e.i. $(x_1 \vee x_2 \vee x_3) \wedge (..) ... \wedge (...)$ where x_i are variable or their negations)

$[(q \Rightarrow p) \Rightarrow (q \Rightarrow r)] \Rightarrow (r \Rightarrow \sim p)$

5. Are the following equalities true. Prove the true one, find a counterexample for the false one.

a) $(A \div C) \cup (A \cap B) = (A \cup C) \setminus [A \setminus (C \setminus B)]$

b) $(A \div C) \cup (A \cap B) = (A \setminus B) \div C$