Name ....

group GA... row .... col....

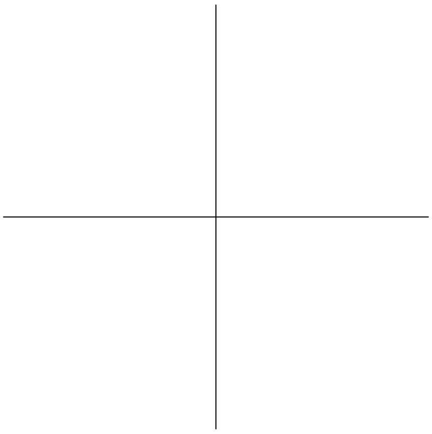
1.	2.	3.	4.	$\sum$

1.(2p) Write the mathematical formulas corresponding to the following statement with the help of the following signs only: propositional connectives, quantifiers, variables varied through set $\mathbb{R}$ and symbols $\in, \mathbb{R}, \mathbb{R}^{\mathbb{R}}, \leq, <, =, \cdot, +, -, 0$.

every odd function has at least one zero

2.(2p) For $x, y \in \mathbb{R}$ let $x \sim y \Leftrightarrow \exists k \in \mathbb{Z}\ x^2 + k = y^2$. Prove $\sim$ is equivalence relation in $\mathbb{R}$. Find equivalence classes $[0]_\sim, [1]_\sim$.

3.(2p) For $f : \mathbb{R}^2 \to \mathbb{R}$ where $f(x, y) = (x + y + 1)(x - y + 2)$
find $f[[-1, 2] \times [-2, 1]] =$
and draw $f^{-1}[[0, \infty)]$



4.(2p) Let $f : \mathbb{N}_+ \to \mathbb{N}$, $f(n) = \max\{i \in \mathbb{N} : 2^i | n\}$.
Find $f[\{10, 11, 12, \ldots, 16\}] =$

and $f^{-1}[\{2\}] =$

Name .... group GA... row .... col....

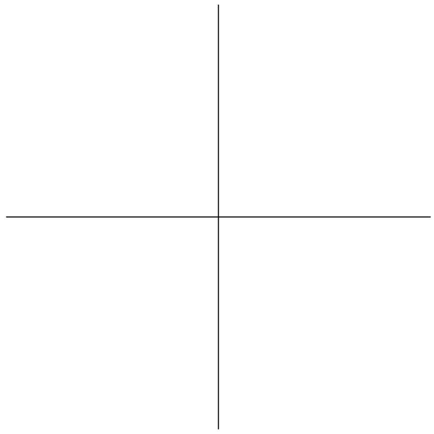
1.	2.	3.	4.	$\sum$

1.(2p) Write the mathematical formulas corresponding to the following statement with the help of the following signs only: propositional connectives, quantifiers, variables varied through set $\mathbb{R}$ and symbols $\in, \mathbb{R}, \mathbb{R}^{\mathbb{R}}, \leq, <, =, \cdot, +, -, 0$.

not every even function has zeros

2.(2p) For $x, y \in \mathbb{Q}_+$ let $x \sim y \Leftrightarrow \sqrt{x \cdot y} \in \mathbb{Q}_+$. Prove $\sim$ is equivalence relation in $\mathbb{R}$. Find equivalence classes $[1]_\sim, [2]_\sim$.

3.(2p) For $f : \mathbb{R}^2 \to \mathbb{R}$ where $f(x, y) = (x + y - 1)(x - y + 2)$
find $f[[1, 2] \times [-2, 1]] =$
and draw $f^{-1}[[0, \infty)]$



4.(2p) Let $f : \mathbb{N}_+ \to \mathbb{N}_+$, $f(n) = \max\{p : p \text{ is prime number and } p|n\}$.
Find $f[\{10, 11, 12, \dots, 16\}] =$

and $f^{-1}[\{2\}] =$