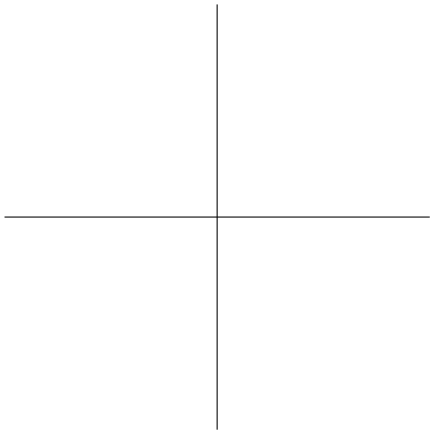
Name ..... CA.... row .... col....

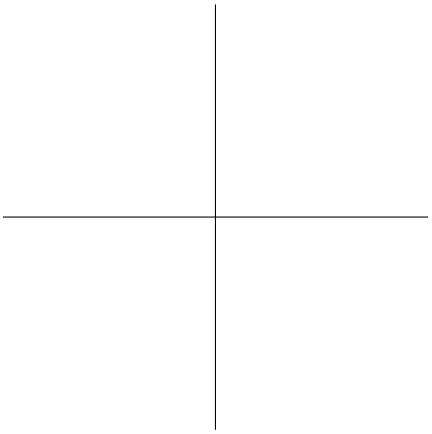
1.	2.	3a.	3b	4.	$\sum$

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

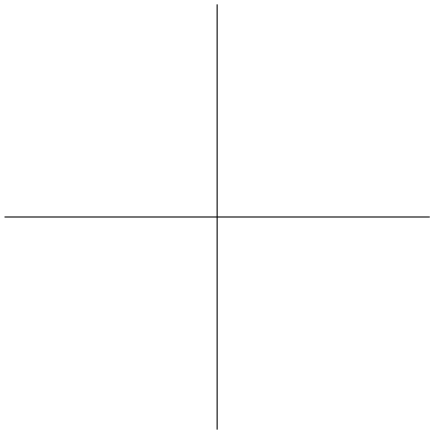
$\bigcap_{a>0} X_{a,b}$



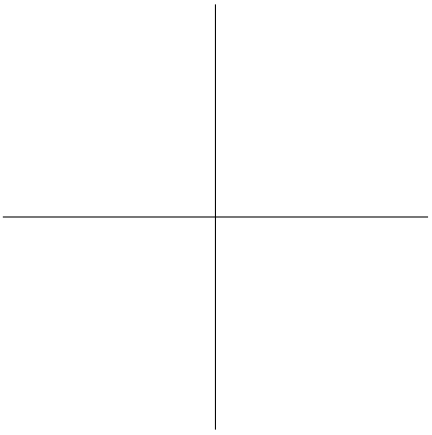
$\bigcup_{b>0} \bigcap_{a>0} X_{a,b}$



$\bigcup_{a<0} X_{a,b}$



$\bigcap_{b>0} \bigcup_{a<0} X_{a,b}$



2. For what X the following equality holds.

$\emptyset \cup \{\emptyset, \{\emptyset, \{X\}\}\} \cup \{\{\emptyset\}\} \cup \{\{\emptyset\}, X\} = \{\emptyset, \{\emptyset, \{\emptyset\}\}, \{\emptyset\}\}$

3. Prove or disprove
$[A \setminus (C \cup B)] \cup [(B \cap C) \setminus A] = (A \cup B) \cap (A \cup C) \setminus [A \cap (C \cup B)]$

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

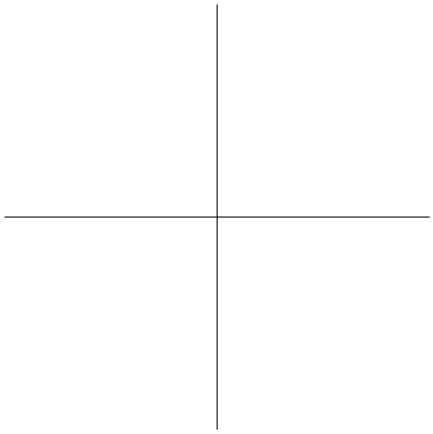
4. Let $\mathcal{A} \subseteq 2^{\mathbb{R}}$. We say that $\mathcal{A}$ has property $(\star)$ if $(\forall X, Y \in \mathcal{A})\ X \cap Y \in \mathcal{A}$. Prove or disprove:
a) family of intervals of integer length i.e $\{(a, b) : a, b \in \mathbb{R}, b - a \in \mathbb{N}^+\}$ has property $\star$.
b) family of discs in a plane union.

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

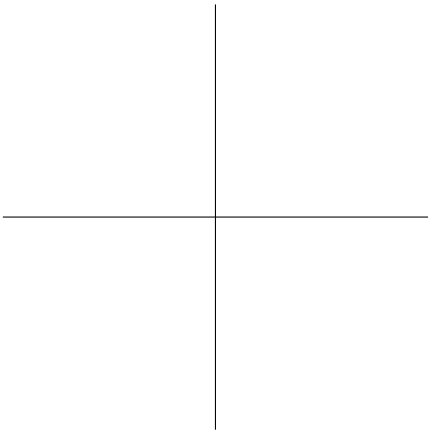
1.	2.	3a.	3b	4.	$\sum$

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

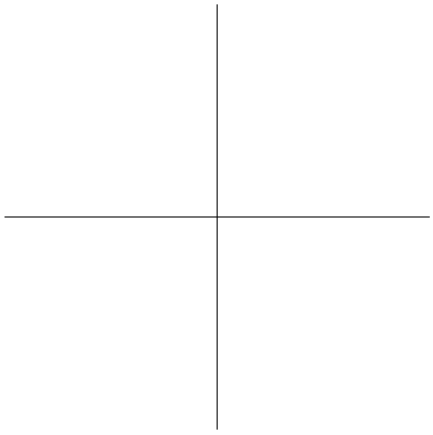
$\bigcap_{a>0} X_{a,b}$



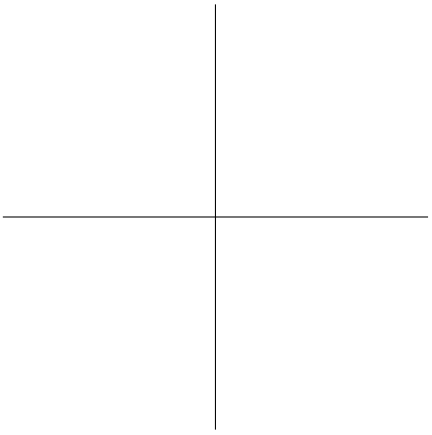
$\bigcup_{b>0} \bigcap_{a>0} X_{a,b}$



$\bigcup_{a<0} X_{a,b}$



$\bigcap_{b>0} \bigcup_{a<0} X_{a,b}$



2. For what X the following equality holds.

$\{\{\emptyset\}, \{\{\emptyset\}\}, \{\emptyset, X\}\} \cap \{\{\emptyset\}, \{\{\emptyset\}\}, X\} \cap \{\{\emptyset\}, \{X\}, \{\{X\}\}\} = \{\{\emptyset\}, \{X\}\}$

3. Prove or disprove
$[C \setminus (A \cup B)] \cup [(A \cap B) \setminus C] = (C \cup B) \cap (C \cup A) \setminus [C \cap (A \cup B)]$

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

4. Let $\mathcal{A} \subseteq 2^{\mathbb{R}}$. We say that $\mathcal{A}$ has property $(\star)$ if $(\forall X, Y \in \mathcal{A})\ X \cap Y \in \mathcal{A}$. Prove or disprove:
a) family of intervals with integer ends i.e $\{(a, b) : a, b \in \mathbb{Z}\}$ has property $(\star)$.
b) family of squares in the plane.