1. true
2. $A \uparrow B$

1 Sheffer Stroke

Definition 1.1. *$A \uparrow B$ if x is not in the intersection of A and B.*

$$A \uparrow B = X \setminus (A \cap B) = (X \setminus A) \cup (X \setminus B) \tag{1}$$

Proposition 1.1.1. 1. Sheffer stroke is associative.

2. Sheffer stroke is commutative.
3. For X the only identity element is $\varnothing$.

Proof. Let $A, B, C \subset X$. We have

$$\begin{aligned}
(A \uparrow B) \uparrow C =& (X \setminus (A \uparrow B)) \cup X \setminus C & (2)\\
=& (X \setminus A) \cup (X \setminus B) \cup (X \setminus C) & (3)\\
=& (X \setminus A) \cup ((X \setminus B) \cup (X \setminus C)) & (4)\\
=& A \uparrow ((X \setminus B) \cup (X \setminus C)) & (5)\\
=& A \uparrow (B \uparrow C) & (6)
\end{aligned}$$

$$\begin{aligned}
A \uparrow B =& (X \setminus A) \cup (X \setminus B) & (7)\\
=& (X \setminus B) \cup (X \setminus A) & (8)\\
=& B \uparrow A & (9)
\end{aligned}$$

$$\begin{aligned}
X \uparrow \varnothing =& X \setminus (X \cap \varnothing) & (10)\\
=& X \setminus \varnothing & (11)\\
=& X & (12)
\end{aligned}$$

□

Corollary 1. Sheffer stroke does not form a group on the power set of X.