Set Operations

Let $U$ be a universal set. If $A$, $B$, and $C$ are any subsets of $U$, then the following hold true:

**Commutative Law for Union:** $A \cup B = B \cup A$
**Commutative Law for Intersection:** $A \cap B = B \cap A$

**Associative Law for Union:** $A \cup (B \cup C) = (A \cup B) \cup C$
**Associative Law for Intersection:** $A \cap (B \cap C) = (A \cap B) \cap C$

**Distributive Law for Union:** $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
**Distributive Law for Intersection:** $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$