Assignment 3

Due on 2017-05-10, 22:00 IST.

Problem 1: Find the truth values of the following statements:

1. $A \land B$ is true

2. $A \lor B$ is true

3. $A \rightarrow B$ is true

4. $A \iff B$ is true

5. $\neg A$ is true

6. $\neg B$ is true

7. $A \land \neg A$ is true

8. $A \lor \neg A$ is true

9. $\neg (A \land B)$ is true

10. $\neg (A \lor B)$ is true

Problem 2: Prove the following:

1. If $A$ and $B$ are two sets, then $A \subseteq B$ if and only if $A \cap B = A$.

2. If $A$ and $B$ are two sets, then $A \cup B = B \cup A$.

3. If $A$, $B$, and $C$ are three sets, then $(A \cap B) \cap C = A \cap (B \cap C)$.

4. If $A$, $B$, and $C$ are three sets, then $(A \cup B) \cap C = (A \cap C) \cup (B \cap C)$.

Problem 3: Let $A$, $B$, and $C$ be sets. Prove the following:

1. $A \cap B = B \cap A$

2. $A \cup B = B \cup A$

3. $(A \cup B) \cup C = A \cup (B \cup C)$

4. $(A \cap B) \cap C = A \cap (B \cap C)$

Problem 4: Let $A$, $B$, and $C$ be sets. Prove the following:

1. $A \subseteq B$ if and only if $A \cap B = A$.

2. $A \cup B = B \cup A$.

3. $(A \cup B) \cup C = A \cup (B \cup C)$.

4. $(A \cap B) \cap C = A \cap (B \cap C)$.

Problem 5: Let $A$, $B$, and $C$ be sets. Prove the following:

1. $A \subseteq B$ if and only if $A \cap B = A$.

2. $A \cup B = B \cup A$.

3. $(A \cup B) \cup C = A \cup (B \cup C)$.

4. $(A \cap B) \cap C = A \cap (B \cap C)$.

Problem 6: Let $A$, $B$, and $C$ be sets. Prove the following:

1. $A \subseteq B$ if and only if $A \cap B = A$.

2. $A \cup B = B \cup A$.

3. $(A \cup B) \cup C = A \cup (B \cup C)$.

4. $(A \cap B) \cap C = A \cap (B \cap C)$.