University of Bahrain
Department of Mathematics
MATHS253: Set Theory
Fall 2018
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# Homework 9: Proofs involving sets

Due November 29, 2018

Name: _____

1. Prove the following statements about the sets

   1. $(A \cup B)^c = A^c \cap B^c$.

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

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

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

2. Prove that if $A \cup B \neq \emptyset$, then $A \neq \emptyset$ or $B \neq \emptyset$.

3. Prove that $A - B = A$ if and only if $A$ and $B$ are disjoint sets.

4. Prove that $A \subseteq B$ if and only if $A \cap B^c = \emptyset$.

5. Prove that $(A \cup B) - C \subset (A \cup C) - (B \cup C)$.

6. Is it correct that $(A \cup C) - (B \cup C) \subset (A \cup B) - C$?

7. Prove that $(A \cap B) - C = (A - C) \cap (B - C)$.

8. Prove that $A \cup B = B$ if and only if $A \subseteq B$.

1. Give an example of three sets such that $A \cup B = A \cup C$ but $B \neq C$.

2. Give an example of three sets such that $A \cap B = A \cap C$ but $B \neq C$.

3. Prove that if $A \cup B = A \cup C$ and $A \cap B = A \cap C$, then $B = C$.