PROOFS USING VENN DIAGRAM

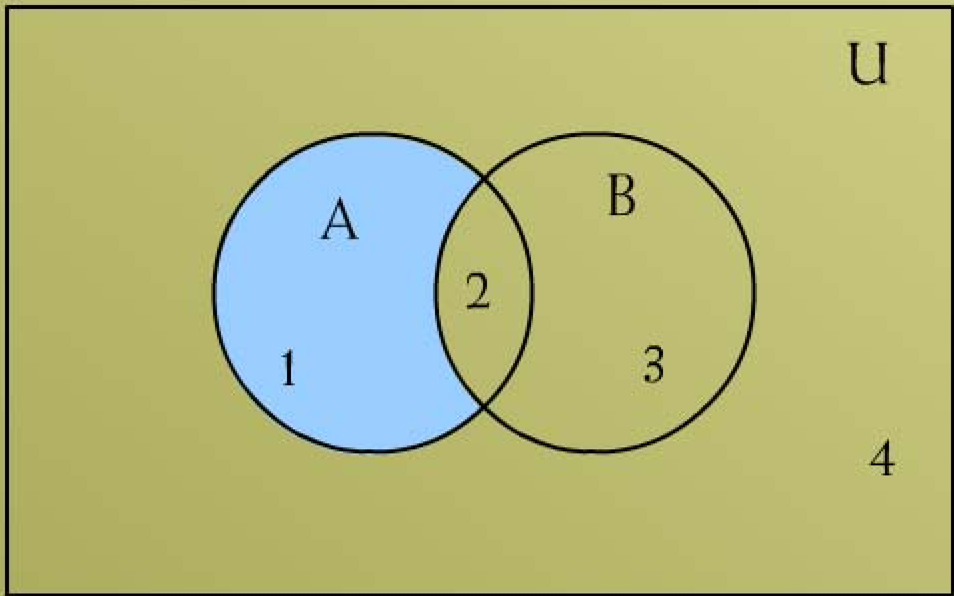
(i) $A - (A - B) = A \cap B$

(ii) $(A \cap B)' = A' \cup B'$

(iii) $A - B = A \cap B'$

SOLUTION

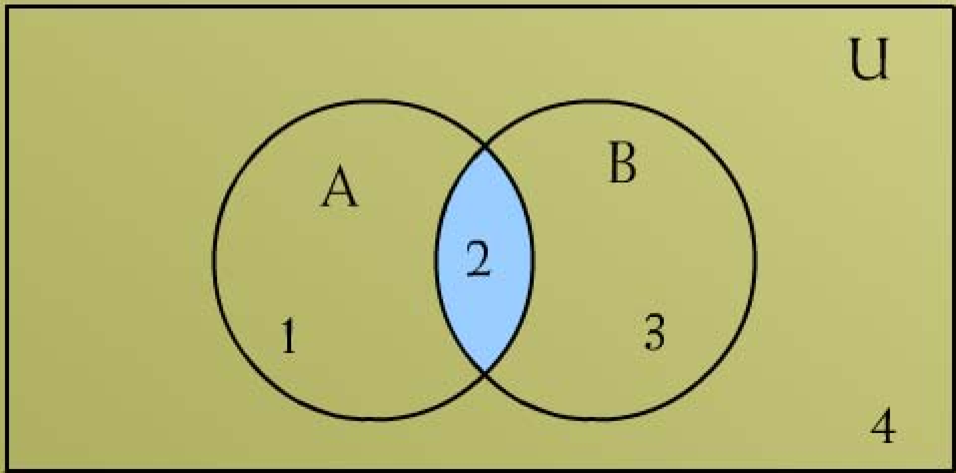
(i) $A - (A - B) = A \cap B$



$A - B = \{1\}$

SOLUTION

(i) $A - (A - B) = A \cap B$

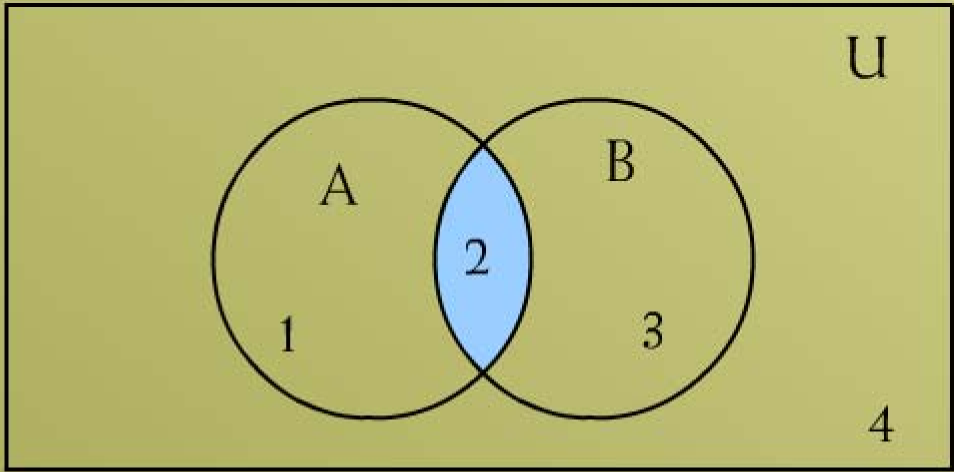


$A - (A - B) = \{2\}$

RESULT: $A - (A - B) = A \cap B$

SOLUTION

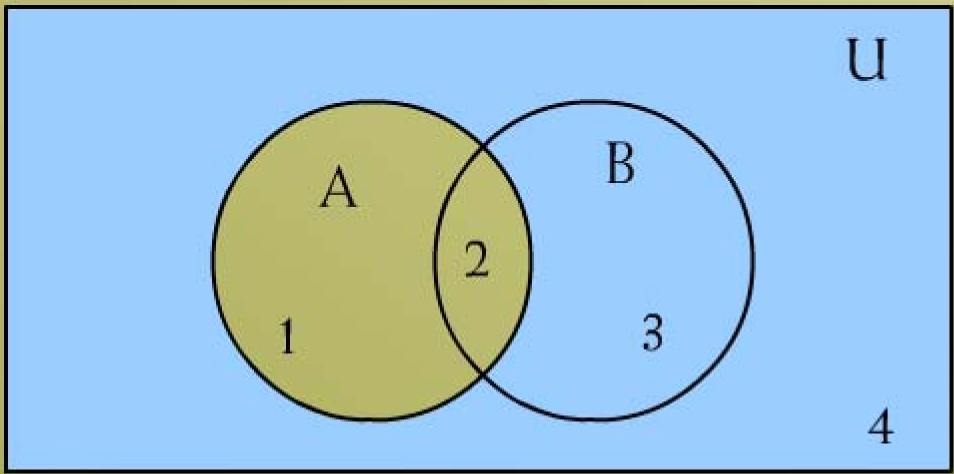
(ii) $(A \cap B)' = A' \cup B'$



$A \cap B$

SOLUTION

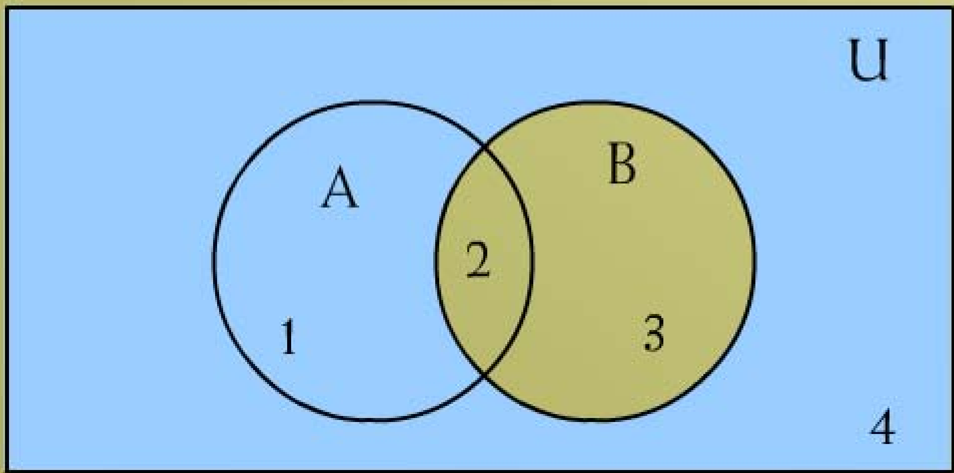
(ii) $(A \cap B)' = A' \cup B'$



A'

SOLUTION

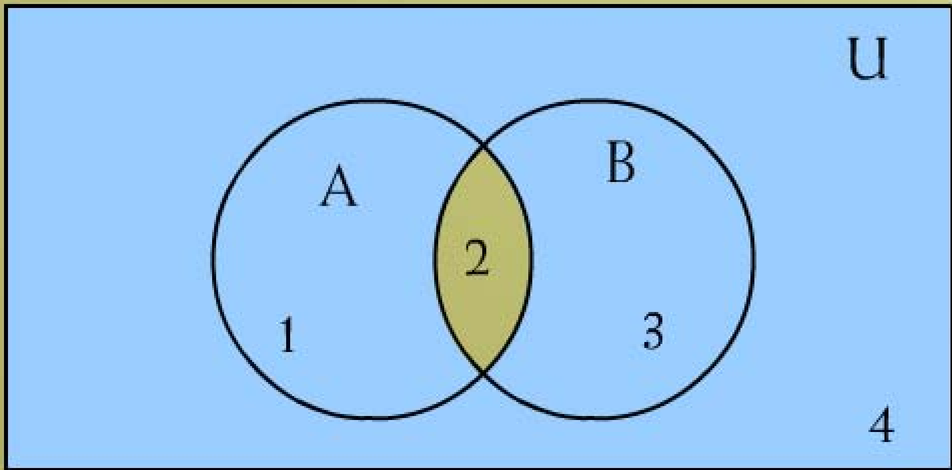
(ii) $(A \cap B)' = A' \cup B'$



B'

SOLUTION

(ii) $(A \cap B)' = A' \cup B'$

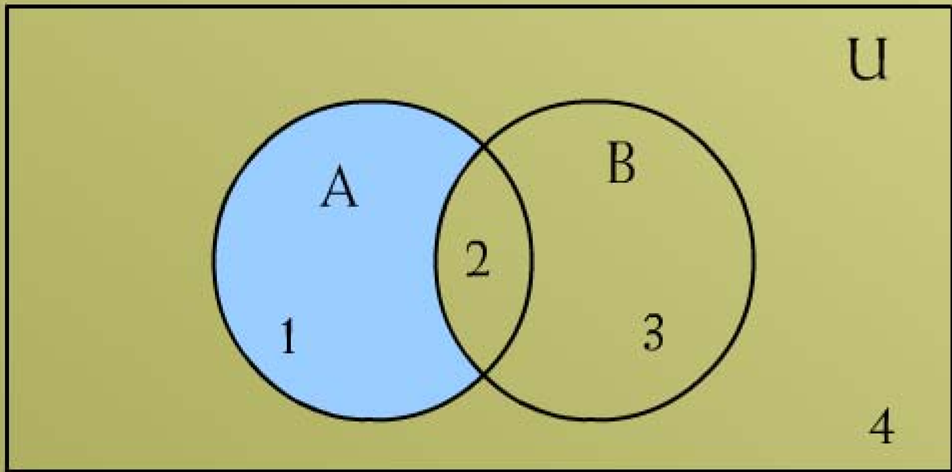


$A' \cup B'$

RESULT: $(A \cap B)' = A' \cup B'$

SOLUTION

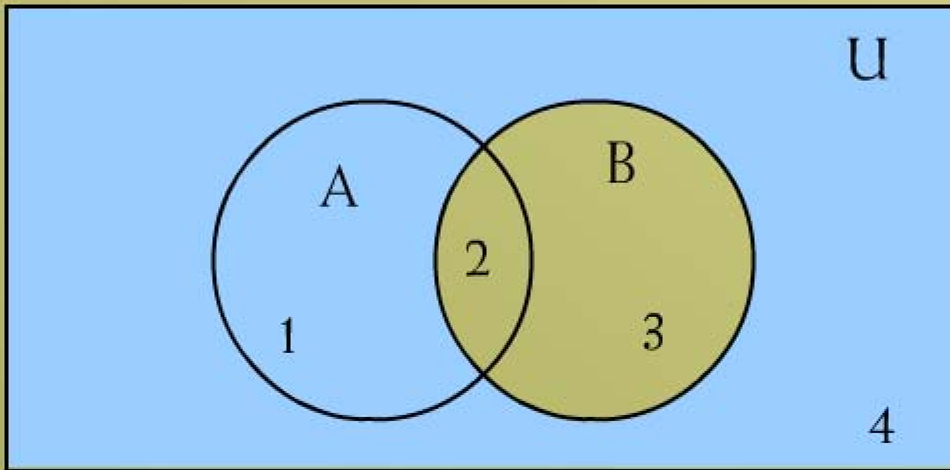
(iii) $A - B = A \cap B'$



$A - B$

SOLUTION

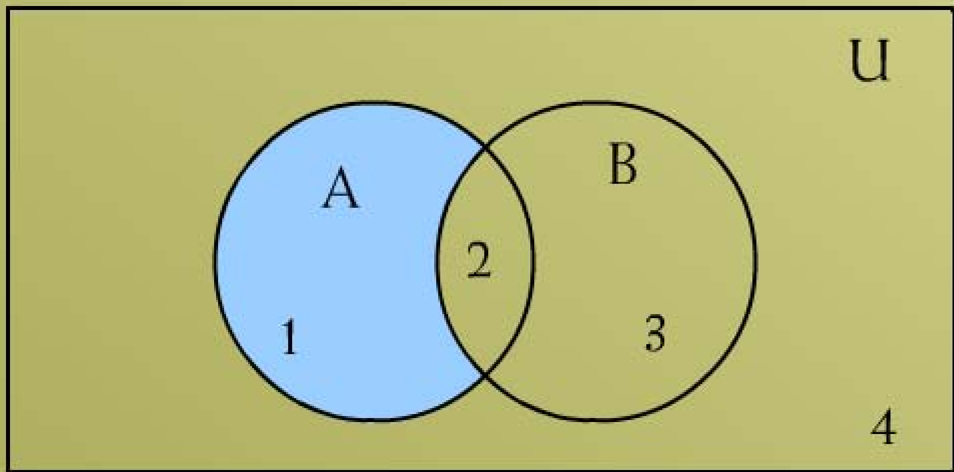
(iii) $A - B = A \cap B'$



B'

SOLUTION

(iii) $A - B = A \cap B'$



$A \cap B'$

RESULT: $A - B = A \cap B'$

SET IDENTITIES

Let A, B, C be subsets of a universal set U.

1. Idempotent Laws

   a. $A \cup A = A$ b. $A \cap A = A$

2. Commutative Laws

   a. $A \cup B = B \cup A$ b. $A \cap B = B \cap A$

3. Associative Laws

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

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

SET IDENTITIES

4. **Distributive Laws**

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

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

5. **Identity Laws**

   a. $A \cup \varnothing = A$

   b. $A \cap \varnothing = \varnothing$

   c. $A \cup U = U$

   d. $A \cap U = A$

6. **Complement Laws**

   a. $A \cup A' = U$

   b. $A \cap A' = \varnothing$

   c. $U' = \varnothing$

   d. $\varnothing' = U$

SET IDENTITIES

7. Double Complement Law

   a. $(A')' = A$

8. DeMorgan's Laws

   a. $(A \cup B)' = A' \cap B'$

   b. $(A \cap B)' = A' \cup B'$

9. Alternative Representation for Set Difference

   a. $A - B = A \cap B'$

SET IDENTITIES

10. **Subset Laws**

   a. $A \cup B \subseteq C$ iff $A \subseteq C$ and $B \subseteq C$

   b. $C \subseteq A \cap B$ iff $C \subseteq A$ and $C \subseteq B$

11. **Absorption Laws**

   a. $A \cup (A \cup B) = A$

   b. $A \cap (A \cup B) = A$