

Homework 10(Problem Numbers are based on 7th Edition of book Discrete Maths and Applications Kenneth Rosen, Indian Adaptation by Kamala Krithivasan)

Problem 20:

Show that if A and B are sets, then $(A \cap B) \cup (A \cap \overline{B}) = A$.

Problem 44:

Show that if A , B , and C are sets, then

$$|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |A \cap C| - |B \cap C| + |A \cap B \cap C|.$$

Problem 45:

Let $A_i = \{1, 2, 3, \dots, i\}$ for $i = 1, 2, 3, \dots$. Find

a) $\bigcup_{i=1}^n A_i$. b) $\bigcap_{i=1}^n A_i$.

Problem 46:

Let $A_i = \{\dots, -2, -1, 0, 1, \dots, i\}$. Find

a) $\bigcup_{i=1}^n A_i$. b) $\bigcap_{i=1}^n A_i$.

Problem 49:

Find $\bigcup_{i=1}^{\infty} A_i$ and $\bigcap_{i=1}^{\infty} A_i$ if for every positive integer i ,

- a) $A_i = \{i, i + 1, i + 2, \dots\}$.
- b) $A_i = \{0, i\}$.
- c) $A_i = (0, i)$, that is, the set of real numbers x with $0 < x < i$.
- d) $A_i = (i, \infty)$, that is, the set of real numbers x with $x > i$.