California State University Sacramento - Math 101

Homework Assignment 1

1) Let $A = \{-3, -2, -1, \ldots, 5, 6, 7\}$.

(a) Is $1 \in A$?

(b) Is $\frac{1}{2} \in A$?

(c) Find $|A|$.

(d) If $B = \{4, 6, 8, 10\}$, find $A \cup B$ and $A \cap B$.

2) Suppose $A_1 = \{1, 2, 3\}$, $A_2 = \{3, 4, 5\}$, and $A_3 = \{4, 5, 6\}$.

(a) Find $A_1 \cup A_2 \cup A_3$.

(b) Find $A_1 \cap A_2 \cap A_3$.

(c) True or False: $|A_1 \cup A_2 \cup A_3| = |A_1| + |A_2| + |A_3|$.

(d) True or False: $|A_1 \cap A_2 \cap A_3| = |A_1||A_2||A_3|$.

3) Suppose $A_1, A_2, \ldots, A_5$ are pairwise disjoint sets with $|A_i| = i$ for $1 \leq i \leq 5$. Determine

$$\left| \bigcup_{i=1}^{5} A_i \right|.$$

4) Find sets $A_1, A_2, \ldots, A_5$ such that $|A_i| = i$ for $1 \leq i \leq 5$ and

$$\left| \bigcup_{i=1}^{5} A_i \right| = 5.$$

5) If $A = \{x : 3 \leq x \leq 10\}$ and $\mathbb{Z}$ is the set of all integers, find

$$|A \cap \mathbb{Z}|$$