## California State University Sacramento - Math 101

## Homework Assignment 1

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

(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  $1 \le i \le 5$ . 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  $1 \le i \le 5$  and

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

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

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