Math 220 – Homework 8

Due Thursday 3/21 at the beginning of class

Total points: 225

(Writing portion 110 pts)

PART A

Problems from the textbook:

- Section 4.2

problem	6*	7(a)*	8*	9*	10*	*12
points	10	10	20	20	20	30

- Section 4.3

problem	1(a)	2(a)	4(a)	5(a)
points	5	5	5	5

PART B

1. [10 points] For a real number r, define M_r to be the interval $[r-3, r]$. Let $A = \{3, 4, 5\}$. Write the sets $\bigcup_{\alpha\in A} M_\alpha$ and $\bigcap_{\alpha\in A} M_\alpha$ in a simpler form (as either an interval or a finite set of points). Show all steps leading to your final answer.

2. [10 points] Let $K = \{a, b, x\}$, $L = \{b, y, e\}$, $M = \{b, e, z\}$, $N = \{a, b, g, w\}$ and $S = \{K, L, M, N\}$. Write the sets $\bigcup_{X\in S} X$ and $\bigcap_{X\in S} X$ in a simpler form (as either an interval or a finite set of points). Show all steps leading to your final answer.

3. [30 points] Let $i \in \mathbb{Z}$ and $A_i = \{i, i+2\}$. Write the following sets in a simpler form (as either an interval or a finite set of points). Show all steps leading to your final answer.

   (a) $\bigcup_{i=1}^{5} A_{2i}$ **(b)** $\bigcup_{i=1}^{50} A_{2i}$ **(c)** $\bigcup_{i=1}^{5} (A_i \cap A_{i+1})$ **(d)** $\bigcup_{i=1}^{50} (A_i \cap A_{i+1})$ **(e)** $\bigcup_{i=1}^{5} (A_{2i-1} \cap A_{2i+1})$

   (f) $\bigcup_{i=1}^{50} (A_{2i-1} \cap A_{2i+1})$

4. [30 points] Repeat the previous problem for $A_i = [i, i+2]$.

5. [15 points] Given $I = \{1, 2, 3, \ldots, 2019\}$. For each $i \in I$ define $B_i = \{i-1, i\}$. Write the following in a simpler form (as either an interval or a finite set of points). Show all steps leading to your final answer.

   (a) $\bigcap_{i\in I} B_i$ **(b)** $\bigcap_{i=j}^{j+1} B_i$ **(c)** $\bigcup_{i=j}^{k} B_i$, where $1 \le j < k \le 2019$.