

Math 220 – Homework 7

Due Wednesday 03/23 at the beginning of class

PART A

Problems from the textbook:

Section 2.1 # 7(e, f, h); 8(b,c, d); 13; 19(b, c); 20(c, f).

Section 2.2 # 15(a), 17(a), 23, 24(b), 25(b), 26

Section 2.3 # 5(b,c,e,f).

PART B

1. Let A, B , and C be nonempty sets. Determine the truth or falsehood of the following statements. (Write TRUE or FALSE for each statement.)
 - (a) $A - A = \emptyset$.
 - (b) $A \subset A$.
 - (c) $A \cup (B \cap C) = (A \cap C) \cup (B \cap C)$.
 - (d) $A \cup A = A \cap A$ for all sets A .
 - (e) If $|A| = |B|$ then $A \times B = B \times A$.
 - (f) $A \times B = B \times A$ for all nonempty sets A and B .
 - (g) If $\{1\} \in P(A)$, then $1 \in A$ and $\{1\} \notin A$.
2. Let $A = \{x \in \mathbb{N} \mid 1 \leq x < 5\}$ and $P(A)$ be a power set of A . Determine the truth or falsehood of the following statements. (Write TRUE or FALSE for each statement.)
 - (a) $A \subset P(A)$.
 - (b) $\{2\} \in P(A)$.
 - (c) $[3, 4] \subseteq A$.
 - (d) $|P(A)| = 32$
 - (e) $\emptyset \subseteq P(A)$ and $\emptyset \in P(A)$.
3. Let A, B , and C be nonempty sets. Prove the following statements.
 - (a) $A \times (B \cap C) = (A \times B) \cap (A \times C)$.
 - (b) $(A \times B) \cap (C \times D) = (A \cap C) \times (B \cap D)$.