

Math 8: Homework 2

Read Chapter 12 and Chapter 17.

Exercises: Hand in all of the following in lecture on Thursday, April 14th.

Chapter 12: #2

Chapter 17: #1, #2, #5, #8, #10

I. Negate the following statements.

(a) $\forall n \in \mathbb{Z}, \exists m \in \mathbb{N}$ such that $n \leq -m$ or $n \geq m$.

(b) $\exists x > 0$ such that $\forall y \in \mathbb{R}, (x > y \Rightarrow y \leq 0)$

(c) Prove the statements in (a) and (b) are false.

II. Let A and B be two sets.

(a) Prove that $P(A) \cap P(B) = P(A \cap B)$.

(b) Give a counterexample to show that $P(A) \cup P(B) = P(A \cup B)$ is false.

III.

(a) Find $P(P(\{1\}))$.

(b) For any set A of natural numbers, what is $A \cap P(A)$? What is $P(A) \cap P(P(A))$? Explain your answers.

(c) Let A , B , and C be any sets. Prove that $(A \setminus B) \times C = (A \times C) \setminus (B \times C)$.