Problem Set 8
CS/MATH 113 Discrete Mathematics

Habib University — Spring 2023

Week 12

1 Problems

Problem 1. [Chapter 2.5, Question 1] Determine whether each of these sets is finite, countably infinite, or uncountable. For those that are countably infinite, exhibit a one-to-one correspondence between the set of positive integers and that set.

(a) the negative integers

(b) the even integers

(c) the integers less than 100

(d) the real numbers between 0 and $\frac{1}{2}$

(e) the positive integers less than 1,000,000,000

(f) the integers that are multiples of 7

Problem 2. [Chapter 2.5, Questions 10] Given an example of two uncountable sets A and B such that $A - B$ is

(a) finite

(b) countably infinite

(c) uncountable

Problem 3. [Chapter 2.5, Questions 11] Given an example of two uncountable sets A and B such that $A \cap B$ is

(a) finite

(b) countably infinite

(c) uncountable

Problem 4. [Chapter 2.5, Questions 12] Show that if A and B are sets and $A \subset B$ then $\mid A \mid \leq \mid B \mid$

Problem 5. [Chapter 2.5, Questions 14] Show that if A and B are sets with the same cardinality, then $\mid A \mid \leq \mid B \mid$ and $\mid B \mid \leq \mid A \mid$