

Homework #11

Last Name: _____

Name : _____

PSID: _____

TRANSITION TO ADVANCED MATHEMATICS
HOMEWORK #11 – DUE TUESDAY, 05/01

Problem 1. Give the definition of finite, infinite, denumerable, countable, and uncountable sets. Give an example for each.

Problem 2. Prove that if domain of a function is finite, then range is finite.

Problem 3. The open interval $(0, 1)$ is uncountable.

Problem 4. The set \mathbb{R} is uncountable and has cardinal number \mathfrak{c} .

Problem 5. The set $A = [2, 5)$ has cardinal number \mathfrak{c} .

Problem 6. Exercise 5.2: Problems 4,5,7,8.

Problem 7. If A is denumerable, then $A \cup \{x\}$ is denumerable.

Problem 8. Prove or disprove:

- (a) If $A \subseteq B$ and B is denumerable, then A is denumerable.
- (b) If $A \subseteq B$ and A is denumerable, then B is denumerable.
- (c) $\mathbb{Q} - \mathbb{Z}$ is denumerable.
- (d) If A and B are denumerable, then $A - B$ is denumerable.
- (e) A is countable if and only if A is equivalent to a subset of \mathbb{N} .
- (f) $\mathbb{Q} \cap (1, 2)$ is denumerable.