

Math 140a Fall 2015 Homework 3

Due Friday October 16 by 5pm in HW box in basement of AP&M

Reading

All references are to Rudin, 3rd edition.

Continue to read Chapter 2. This homework concerns countability of sets, metric spaces, and problems related to open and closed sets and limit points.

Assigned problems (write up full solutions and hand in):

Chapter 2: #2, 3, 5, 6, 8, 9, 11.

Remark on #2: You may use without proof that given a fixed polynomial equation $a_n z^n + a_{n-1} z^{n-1} + \cdots + a_0 = 0$, with coefficients $a_i \in \mathbb{C}$, there are at most n distinct $z \in \mathbb{C}$ which satisfy the equation. (This is proven in a course on abstract algebra)

Problem not from the text (also to be handed in):

A. (a) Let S be the collection of all finite subsets of the natural numbers \mathbb{N} . Prove that S is countable.

(b). Let S be the collection of all subsets of \mathbb{N} . Prove that S is uncountable.