

Math 112: Real Analysis– Homework 1

Due Tuesday, February 2, 2016

(1) Rudin, Chapter 1, Problems 1-5

(3) Let $\mathbb{F}_2 = \{0, 1\} = \mathbb{Z}/2\mathbb{Z}$ with the operations $+, \times$ defined by

$$0 + 0 = 0, \quad 1 + 0 = 1, \quad 0 + 1 = 1, \quad 1 + 1 = 0$$

and

$$0 \times 0 = 0, \quad 1 \times 0 = 0, \quad 0 \times 1 = 0, \quad 1 \times 1 = 1.$$

Show that \mathbb{F}_2 is a field, but that it cannot be made into an ordered field.

(3) (Challenge problem, worth 0 points, but +10 street cred). If $p \in \mathbb{Z}$ is prime, show that $\mathbb{Z}/p\mathbb{Z}$ is a field.