HOMEWORK 12

MATH 2001

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ABSTRACT. This is the first homework assignment. The problems are from Hammack [**?**, Ch. 11, §11.4]:

- **Chapter 11 Section 11.4**, Exercises: 4, 6.

CONTENTS

CHAPTER 11 SECTION 11.4

Ch.11, §11.4, Exercise 4. Suppose P is a partition of a set A. Define a relation R on A by declaring xRy if and only if $x, y \in P$. Prove R is an equivalence relation on A. Then prove that P is the set of equivalence classes of R.

Date: April 27, 2020.

Solution to Ch.11, §11.4, Exercise 4.

Proposition: R is an equivalence relation on A.

Proof: Assume $a \in A$, $a \in X$ for some $X \in P$, so we have aRa, thus R is reflexive. Assume $a, b \in A$ and aRb, we have $a, b \in X$ for some $X \in P$, so bRa, thus R is symmetric. Assume $a, b, c \in A$, also suppose aRb and bRc, we have $a, b \in X$ for some $X \in P$ and $b, c \in Y$ for some $Y \in P$. Because every part of P is unique, it follows $X = Y$, so we have aRc, thus R is transitive.

Proposition P is the set of equivalence class of R.

Arbitrary chose a element in set A, we have the equivalence class $[a]$, then $[a] = \{x : xRa\}$. There for $a, x \in X$ for some $X \in P$.

□

Ch.11, §11.4, Exercise 6. Describe the equivalence relation whose equivalence class are the elements of P.

Solution to Ch.11, §11.4, Exercise 6. $R =$ Sum equals to zero.

□

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