

Solutions to Exercises from ‘Algebra: Chapter 0’

ABSTRACT. Solutions to exercises from the book 'Algebra: Chapter 0' by Paolo Aluffi.

Contents

Preface	v
Chapter 1. Preliminaries: Set theory and categories	1
1. Naive set theory	1

Preface

This document contains my attempt at writing (hopefully correct!) solutions to exercises from Aluffi's book, while engaging in some self-study of modern abstract algebra with the ultimate aim of teaching myself some modern algebraic geometry.

CHAPTER 1

Preliminaries: Set theory and categories

1. Naive set theory

EXERCISE 1.1. Let $U = \{x \mid x \notin x\}$. Then, $U \notin U \iff U \in U$, a contradiction. This is Russell's paradox. Either we assume the *set of all sets* doesn't exist, or we need to give up the axiom of *unrestricted comprehension* in set theory.