Math 446 — Exam 1 — Review Topics

Chapter 1. Introduction.
    operations on sets, showing equality, inclusion, etc.
    Exercises x1.2, 1.4, 1.5

Chapter 2. Equinumerosity.
    definitions and basic properties of $=_c$, $\leq_c$
    finite, countable, enumerations, and the Schröder-Bernstein Theorem
    the power set and function spaces
    cardinality of $\mathbb{R}$
    Exercises x2.3, 2.5, 2.6, 2.7

Chapter 3. Paradoxes and Axioms.
    general comprehension and Russell's Paradox
    Zermelo's axioms I-VI
    classes, showing classes are or are not sets
    Exercise x3.2

Chapter 4. Are Sets All There is?
    ordered pairs
    relations and functions as sets of ordered pairs
    equivalence relations
    cardinal numbers and cardinal arithmetic
    Exercises x4.3, 4.4, 4.5, 4.7, 4.12, 4.14

Chapter 5. Natural Numbers.
    Peano systems, existence and uniqueness
    Recursion Theorem
    $+$, $\cdot$, and $\leq$ on $\mathbb{N}$
    well orderings
    finite, countable, $\aleph_0$
    Pigeonhole principle
    finite sequences ("strings")
    Exercises x5.1, 5.2, 5.4, 5.6, 5.8