Below you will find the list of some of the topics which may appear on the exam, and some suggestions for preparation. References are made to the corresponding pages/statements in the textbook.

1. Review the homework assignments 1–8 and the two quizzes.

2. Know the definitions of
   (a) basic operations with sets (union, intersection, complement, containment and equality of sets, Cartesian product, power set)
   (b) a function, injective, surjective, and bijective functions, composition of functions, inverse of a function, a graph of a function, inverse images and level sets
   (c) bounded subsets of $\mathbf{R}$ and bounded real-valued functions, increasing/decreasing real-valued functions
   (d) logical operations and quantifiers ($\forall$, $\exists$, $\neg$, $\wedge$, $\vee$, $\Leftarrow$, $\Leftrightarrow$)
   (e) finite, infinite, countable sets, the size of a finite set, two sets having the same cardinality

3. Be familiar with the following:
   (a) the arithmetic-geometric mean inequality, the triangle inequality (4–5)
   (b) properties of the real number system (16–17; you do not have to remember which properties are axioms and which are propositions)
   (c) direct, contrapositive and "by contradiction" proof techniques (35–39)
   (d) principles of induction (51–57) and strong induction (63–64), well-ordering property of $\mathbf{N}$ and the method of descent (64–66)
   (e) the fact that two finite sets have the same number of elements (size) if and only if there exists a bijection between them
   (f) the fact that if two functions are injective/surjective/bijective, then so is their composition (Proposition 4.30, proved in class)
   (g) that two finite sets have the same number of elements (size) if and only if there exists a bijection between them (Proposition 4.37, proved in class)
   (h) examples of countable sets discussed in Chapter 4 and in class (89–90)