Table of Contents

Introduction	1
0 Notation and preliminaries	2
0.1 The concept of a function	2
0.2 Sequences, countable sets and properties of $\mathbb N$	4
0.3 Properties of \mathbb{R}	5
0.4 Properties of $\mathbb C$	7
0.5 The axiom of choice	9
1 Normed vector spaces and inner product spaces	10
2 Metric spaces and their topologies	15
3 Continuous functions on metric spaces	22
4 Topological spaces	26
5 Continuous functions on topological spaces	34
6 Compact sets	36
6.1 Two classical results	37
6.2 Compactness and sequentially compactness	41
6.3 Heine–Borel's theorem	47
6.4 Continuous functions on compact spaces	49
7 Connected sets	52
8 Homeomorphisms	58
References	60