

Content

1	Set and Map — 1
1.1	Set — 1
1.2	Map — 6
1.3	Counting — 13
1.4	Equivalence Relation and Quotient — 18
2	Metric Space — 25
2.1	Metric — 25
2.2	Ball — 30
2.3	Open Subset — 32
2.4	Continuity — 38
2.5	Limit Point — 43
2.6	Closed Subset — 45
3	Graph — 49
3.1	Seven Bridges in Königsberg — 49
3.2	Proof of One-Trip Criterion — 52
3.3	Euler's Formula — 56
3.4	Application of Euler's Formula — 59
4	Topology — 63
4.1	Topological Basis and Subbasis — 63
4.2	Open Subset — 67
4.3	Topological Space — 70
4.4	Comparing Topologies — 75
4.5	Limit Point and Closed Subset — 80
4.6	Closure — 85
5	Topological Concepts — 91
5.1	Continuity — 91
5.2	Homeomorphism — 96
5.3	Subspace — 101
5.4	Product — 105
5.5	Quotient — 109
6	Complex — 117
6.1	Simplicial Complex — 117
6.2	CW-Complex — 122

6.3 Projective Space — 124

6.4 Euler Number — 127

7 Topological Properties — 131

7.1 Hausdorff Space — 131

7.2 Connected Space — 135

7.3 Path Connected Space — 139

7.4 Connected Component — 145

7.5 Compact Space — 147

7.6 Limit Point Compact Space — 159

8 Surface — 165

8.1 Manifold — 165

8.2 Surface — 167

8.3 Simplicial Surface — 172

8.4 Planar Diagram — 174

8.5 Cut and Paste — 177

8.6 Classification of Surface — 179

8.7 Recognition of Surface — 182

9 Topics in Point Set Topology — 189

9.1 Normal Space — 189

9.2 Paracompact Space — 193

9.3 Complete Metric Space — 197

9.4 Baire Category Theorem — 202

9.5 Infinite Product — 210

9.6 Space-Filling Curve — 217

9.7 Space of Maps — 221

Index — 233