Foundations of Mathematics (Math 131)

Department of Mathematics - College of Science - King Saud University

Second Semester: 1447 (January, 2026- June, 2026)

List of Recommended Exercises

Recommended book: Mathematical Proofs: A Transition to Advanced Mathematics, Fourth Edition, Chartrand/Polimeni/Zhang

Recommended Exercises from the above book: You will not be able to do every suggested problem, but to be successful you should attempt a good many. Discuss them with your classmates!

1) **Sets**

Section 1.1 – Describing a Set:

1.1, 1.2, 1.3, 1.4, 1.8

Section 1.2 – Subsets:

1.10, 1.11, 1.12, 1.13, 1.14, 1.17, 1.20

Section 1.3 – Set Operations:

1.22, 1.23, 1.26, 1.28, 1.29

Section 1.4 – Indexed Collections of Sets:

1.36, 1.40, 1.45

Section 1.5 – Partitions of Sets:

1.48, 1.50, 1.52, 1.55

Section 1.6 – Cartesian Products of Sets:

1.59, 1.63, 1.64, 1.66

2) Logic

Section 2.1 – Statements:

2.1, 2.2, 2.3, 2.4, 2.6, 2.8

Section 2.2 – Negations:

2.11, 2.12, 2.13

Section 2.3 – Disjunctions and Conjunctions:

2.15, 2.16, 2.17, 2.18

Section 2.4 – Implications:

2.19, 2.20, 2.21, 2.23, 2.24, 2.29

Section 2.5 – More on Implications:

2.30, 2.31, 2.33, 2.34

Section 2.6 – Biconditionals:

2.35, 2.36, 2.38, 2.40, 2.43

Section 2.7 – Tautologies and Contradictions:

2.46, 2.47, 2.49, 2.50

Section 2.8 – Logical Equivalence

2.53, 2.54, 2.57, 2.58

Section 2.9 – Some Fundamental Properties of Logical Equivalence

2.60, 2.61, 2.62, 2.63, 2.64, 2.65, 2.66

Section 2.10 – Quantified Statements

2.67, 2.69, 2.71, 2.72, 2.73, 2.74, 2.75, 2.80, 2.81

*Exercises for the remaining chapters will be added later