Sections Covered
Chapter 1
Chapter 2, §1 through 4

Definitions
Know the following definitions:

• function
• increasing and strictly increasing (and decreasing) function
• upper bound and least upper bound of a function (and lower bounds & greatest lower bounds)
• a sequence converges to a number \( A \)
• a sequence diverges
• a sequence is bounded (and above & below)
• a sequence diverges to \( \infty \)
• increasing and strictly increasing (and decreasing & strictly decreasing) sequence
• a sequence has a property eventually

Theorems and Proofs
Know the following theorems and proofs:
Thm 1.4.6 “\( < \epsilon \text{ Means 0} \)”, Thm 1.6.9 “\((0, 1) \text{ is Uncountable} \)”, Thm 1.8.5e Triangle Inequality, Thm 2.1.9 Uniqueness of Limits, Thm 2.1.11 “Convergence Gives Bounded”, Thm 2.1.12 “Converge to Nonzero is > 0”, Thm 2.2.1 + Cor 2.2.4 Algebra of Limits, Thm 2.2.7 “A Bounded 0 Is Still 0”, Thm 2.3.2 Comparison Theorem, Thm 2.3.3 Algebra of Divergence, Thm 2.3.6 “\( \infty^{-1} = 0 \)”

Techniques
Know how to:

• Prove a set is countable or uncountable.
• Construct a proof by induction.
• Prove a sequence converges (\( \epsilon - n \) and/or using the algebra of limits)
• Prove a sequence diverges
• Prove a sequence diverges to \( \infty \) or \( -\infty \)
• Use Theorem 2.4.4 to determine if a sequence converges

Review Problems (True/False)

• Pages 55-57 #11, 12, 13, 15, 17, 20, 21, 22, 30, 32, 33, 34, 45, 46, 47
• Pages 111-113 #1, 2, 8, 10-12, 14, 15, 21, 22, 24, 26, 27, 28, 29, 31, 37, 38, 40-47