Review List

I. Know the statements, and how to use, the following theorems/properties:

1. Archimedean property of $\mathbb{R}$

2. Density of $\mathbb{Q}$ in $\mathbb{R}$, density of the irrationals in $\mathbb{R}$

3. Nested Interval Property of $\mathbb{R}$

4. Montone Convergence Theorem

5. Bolzano-Weierstrass Theorem

6. Cauchy Criterion for convergence of sequences

7. Theorem 3.2.5, and Theorems 3.2.13, 3.2.14

II. Know, and understand, the statements of the definitions for

1. An upper/lower bound on a set or sequence

2. The supremum (infimum) of a set in $\mathbb{R}$

3. Axiom of completeness

4. Countable set

5. **Limit of a sequence**

6. Cauchy Sequence

7. The symbol $\sum_{i=1}^{\infty} a_n$

8. Absolute/conditional convergence of a series

9. Open and closed subsets of $\mathbb{R}$

10. The limit points of a set $S \subset \mathbb{R}$

11. The closure, $\overline{S}$, of a set $S \subset \mathbb{R}$

III. Be able to prove that

1. A sequence a_n converges to a limit L using the definition of a limit

2. A sequence a_n has a limit, even if you don't know its value, by using the monotone convergence theorem, or the Cauchy criterion.

3. A limit exists/does not exist using the Algebraic limit theorems

4. $\sqrt{3}$ is not rational.

5. Ahow that a series converges/diverges using the comparison test or alternating series test.

6. a certain statment is true, using induction

7. A set $S \subset \mathbb{R}$ is open or closed, or has certain points as limit points, or a certain set as its closure.

8. A bounded set S has $sup\, S = L$ using Lemma 1.3.7