Final exam checklist

Math 500: Intermediate Analysis, Spring 2017

Learning how to do the following has been important in our course. (Look at how much you have learned!) Although this is **not** an exhaustive list, it may be useful in identifying which topics to focus on when studying.

Specific goals.
☐ Find the supremum and infimum of a subset of $\mathbb{R}$.
☐ Prove that the limit of a sequence is a certain number/infinite.
☐ Use induction and the monotonic convergence theorem to prove that a sequence converges.
☐ Calculate the limit supremum and limit infimum of a sequence.
☐ Prove that a function is continuous at a point of its domain, or on its domain.
☐ Prove that a function is uniformly continuous on an interval.
☐ Prove or disprove that a sequence of function converges uniformly to a limit function.
☐ Find the limit of a function, and prove it.
☐ Decide whether a function is differentiable, and find its derivative if it is.
☐ Find the limit of a function that isn't written as a quotient of functions using L'Hôpital's rule.
☐ Calculate a Riemann integral using partitions and upper/lower sums.
☐ Know the statements of the Fundamental Theorems of Calculus, and how to apply them.
☐ Prove statements about logarithm and exponential functions using their definitions.
☐ Rewrite an improper integral as the (sum of) limit(s) of integrals of bounded functions on closed, bounded integrals.
☐ Prove that an infinite series converges or diverges.
☐ Use uniform convergence and the Weierstrass M-test to prove that a series of functions converges to a continuous function on a given interval.

Prove a statement _____.
☐ using mathematical induction.
☐ about functions between sets.
☐ about infima/suprema.
☐ using the Intermediate Value Theorem.
☐ using the Mean Value Theorem.
☐ about derivatives/integrals.
☐ about infinite series.