Review List

Know the statement or definition for each of the following: (when there is an $\epsilon\delta$-definition as well as a version using sequences, you should know both).

1. $\lim_{n\to\infty} x_i = l$ for a sequence $(x_i) \subset \mathbb{R}$
2. $\lim_{x\to a} f(x) = L$ for a function $f : A \subset \mathbb{R} \to \mathbb{R}$
3. $f(x)$ is continuous at $x = c$
4. $f(x)$ is uniformly continuous on $S \subset \mathbb{R}$.
5. $f(x)$ is differentiable at $x = c$
6. the Mean Value Theorem
7. the Intermediate Value Theorem
8. Darboux's Theorem
9. $K \subset \mathbb{R}$ is compact
10. $f_n(x) \to f(x)$ uniformly/pointwise on $S \subset \mathbb{R}$.
11. Weierstrass M-test
12. Monotone Convergence Theorem
13. Bolzano-Weierstrass Theorem
14. Nested Interval Property
15. Completeness of $\mathbb{R}$

You will be asked 1) to show whether a certain limit exists, 2) analyze the continuity of a function, and 3) prove that a function is differentiable at a certain point. You should know how to use the Mean Value theorem, the Intermediate Value theorem and Darboux's theorem. Finally, you will need to understand the implications of uniform convergence for a sequence of functions and/or a series of functions. The problems will be designed to test whether you know the theorems or definitions and how to apply them, not whether you know every trick that can be useful.