Review for Final Exam

For each of the following topics, find (from homework, exams, quizzes, worksheets, and your book) one of each of the following:

(a) a theorem pertaining to the topic,
(b) an example that demonstrates the theorem (this makes remembering theorems easier),
(c) a problem involving the topic, and
(d) a solution to that problem.

1. Logic
2. Connectives (⇒, ⇐, ⇔, ∧, ∨, etc.)
3. Sets (unions, intersections, complements)
4. Set equality/inclusion
5. Functions (surjective/injective)
6. Cardinality (equal to, less than or equal to)
7. Equivalence relations
8. Partitions
9. Induction (maybe try one where the base case is not 1)
10. sup, inf, max, min (when do they exist?)
11. Open/closed sets
12. Boundary vs. bounds (bounded)
13. Closure, accumulation points
14. Compact sets (by definition vs. using Heine-Borel)
15. Limit of a sequence (definition)
16. Limit of a sequence using tests
17. Limsup / liminf (and subsequences)
18. Which sequence limits can we actually compute?
19. Bounded and/or monotonic sequences
20. Sequence of partial sums
21. Which series can we actually compute (not just determine conv/div)?
22. Conditional vs. absolute convergence
23. Other series tests

24. Power series (radii/intervals of convergence)

25. Limits of functions (definition)

26. Continuity of functions (at points vs. entire domain)

27. Something I haven’t thought of? Something I didn’t include that you know you need extra work on...

**Tips and extra information**

The exam is 2 hours long, with 10 questions, 40% of which (so roughly 4 out of 10 questions) will be on new material. Items 15 and beyond are new material, but even starting with question 6, the material starts getting harder. Start studying early - **at least** an hour each day until the final.