Midterm 1 study guide

- Make sure you can do all the practice problems listed in the notes from chapter 11 (series).
- Definitions and Theorems you need to know to state and use:

  1. Sequences, limit of a sequence.
  2. How to find the limit of a recursively defined sequence, if such a limit exists.
  3. Behavior of the geometric sequence.
  4. Limit laws for sequences and the squeeze theorem for sequences.
  5. If a sequence converges absolutely to 0, then it converges normally to 0 as well.
  6. A monotone increasing sequence converges.
  7. Series, the sequence of partial sums, definition of series convergence.
  8. Basic divergence test.
  9. The geometric series.
  10. Telescoping series.
  11. A positive terms series converges if and only if it is bounded.
  12. The integral test.
  13. p-series test.
  14. Comparison test. Limit comparison test.
  15. Absolute convergence implies convergence
  16. Conditional convergence.
  17. Alternating series test.
  18. Alternating series error estimate (p. 578)
  19. Ratio test, Root test.
  20. Power series.
  21. Deriving new series from existing ones via substitutions.
  22. Deriving new series from existing ones derivatives and integrals.
  23. Taylor series.
  24. Theorem 2 on page 599.
  25. Power series expressions for sin, cos, exp, ln(1+x), arctangent.

- Theorems you need to be able to prove:

  1. Basic divergence test
  2. A positive terms series converges if and only if it is bounded
  3. p-series test

4. A series that converges absolutely also converges normally
5. (Idea of the) proof of the ratio test

- Extra practice problems, from the "Chapter Review Exercises" on page 609:

1. 3, 8, 9, 10, 17, 18, 19
2. 29, 30, 33, 34, 37, 40
3. 44, 45, 46, 54
4. 63, 66, 67, 69, 70, 75, 76, 81, 82, 85
5. 93, 95, 96, 97, 103, 105