

First posted: Tue Mar 21 20:30:57 MST 2006
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1 This list is not in final form. Like, stuff may yet be added to it.

2 Test #2 is

Friday
3/24/06.

3 The test will cover the material of Assignments #1 – #21, with emphasis on #12 – #21. That is, sections 7.8, and 11.1-11.5.

4 Be sure you know

- (a) how to evaluate improper integrals, especially those of form $\int_a^\infty f(x) dx$.
- (b) a short list of famous improper integrals, both convergent and divergent
- (c) how to use comparison tests to show convergence of improper integrals
- (d) Cauchy’s formal definition of $\lim_{n \rightarrow \infty} a_n = L$.
- (e) how to write a formal Cauchy-style proof of a sequence limit, like with the \mathbf{N} -recipe.
- (f) how to write a Cauchy-style proof of the *Squeeze Theorem* for sequences.
- (g) a short list of famous sequences and their limits, or lack thereof.
- (h) algebra expediciencies: rationalizing the numerator and “The Old Log Trick”.
- (i) how to do l’Hôpital’s Rule.
- (j) how to do factorial algebra and factorial-like algebra (we see this in connection with the *Ratio Test*).
- (k) In the integral test and the alternating-series test you need to be able to check that a function is decreasing eventually. We cannot really rely on testing the first dozen terms, rather, we have
 - (i) the MATH-170 *First-Derivative Test*
 - (ii) direct algebraic investigation of $a_n - a_{n+1}$ or $\frac{a_{n+1}}{a_n}$
- (l) the difference between “sequence” and “series”.

- (m) how to spot telescoping series
- (n) how to invoke *the Test for Divergence*
- (o) how to handle *Geometric Series*.
- (p) how and when to invoke *the Integral Test*.
- (q) how to draw the pictures which justify the integral test. This came up in Assignment #22.
- (r) how and when to invoke *the Comparison Test for Series*.
- (s) how and when to invoke *the Limit Comparison Test*.
- (t) a list of series of known convergence behavior to help with comparison tests.
- (u) how to approximate the sum of a convergent series for
 - (i) series involved with the integral test
 - (ii) alternating series
- (v) how and when to invoke *Alternating-Series Test*.

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