Math 1B final review sheet

Dec 13, 2009

1 Some things that you should (still) know

The numbers in parentheses are the sections of the textbook where the corresponding topics are described. The topics in boldface are (in my opinion) those that you should review first — any topic below can be on the exam, but the boldface ones are likely to be used in several problems.

- **Table of integrals** (5.4)
- **Substitution in integrals, indefinite and definite** (5.5)
- **Integration by parts, indefinite and definite** (7.1)
- Reduction formulas — you do not have to remember them by heart, but you might be asked to derive one (7.1)
- **Trigonometric identities, except those in the red box on page 465**
- Strategy for integrating trigonometric expressions (7.2)
- Trigonometric substitutions for $\sqrt{a^2 - x^2}$, $\sqrt{a^2 + x^2}$, $\sqrt{x^2 - a^2}$ (7.3)
- **Integration of rational functions by partial fractions** (7.4)
- Rationalizing substitution (7.4)
- **Strategy for integration** (7.5)
- Approximate integration formulas (7.7)
- Error bounds for approximate integration (7.7)
- Calculating improper integrals (7.8)
- Comparison Theorem for improper integrals (7.8)
- Arc length and arc length function (8.1)

- Area of a surface of revolution (8.2)
- Hydrostatic force (8.3)
- Moments and centroids (8.3)
- Theorem of Pappus (8.3)
- **Limits of sequences: reduction to limits of functions** (11.1)
- Limit laws for sequences (page 678)
- Monotonic sequences (11.1)
- Squeeze Theorem for limits of sequences (11.1)
- Sum of series as the limit of the sequence of partial sums (11.2)
- Geometric series (11.2)
- Test for divergence of series (page 692)
- Integral Test for series (11.3)
- Remainder estimates for the Integral Test for series (11.3)

- **Direct comparison test (11.4)**
- **Limit comparison test (11.4)**
- Remainder estimate for the direct comparison test (11.4)
- Alternating series test (11.5)
- Remainder estimate for the alternating series test (11.5)
- **Absolute and conditional convergence (11.6)**
- Remainder estimate for absolutely convergent series (11.6)
- Ratio Test (11.6)
- Root Test (11.6)
- Strategy for testing series (11.7)
- **Power series** (11.8)
- Radius and interval of convergence of power series (11.8)
- Power series for $\frac{1}{1-x}$ (11.9)
- Differentiation and integration of power series (11.9)

- **Taylor and Maclaurin series** (11.10)
- Maclaurin series for e^x, $\sin x$, $\cos x$, and $(1+x)^k$ (11.10)
- Taylor's inequality (11.10)
- Approximate integration using power series (11.10)
- Multiplication and division of power series (11.10)
- Finding limits using power series (11.10)
- Approximating functions by Taylor polynomials (11.11)
- **Differential equations** (9.1)
- Initial-value problems (9.1)
- Direction fields (9.2)
- Euler's method (9.2)
- Separable equations (9.3)
- Orthogonal trajectories (9.3)
- Mixing problems (9.3)

- Law of natural growth (9.4)
- Logistic equations (9.4)
- **Firt-order linear equations** (9.5)
- Predator-prey systems (9.6)
- **Second-order linear homogeneous equations** (17.1)
- Initial-value problems (17.1)
- Boundary-value problems (17.1)
- Method of undetermined coefficients (17.2)
- Method of variation of parameters (17.2)
- Damped vibrations (17.3)
- Electric circuits (17.3)
- Series solutions for differential equations (17.4)