

18.01A-18.02A Calculus Fall 2008

A syllabus is given below; specific readings and exercises are on the problem sets.)

Admission Requirements: *(strictly monitored for both subjects)*

18.01A: 4 or 5 on the AB test or on the AB subscore of the BC test, or a comparable grade on the A-level or IB exams, or in a comparable college calculus subject (show transcript and syllabus), or a pass on Part I of the M.I.T. 18.01 AP test (given R/O week);

18.02A: pass 18.01A, or AP credit for 18.01 through usual mechanisms

Text: Simmons: Calculus with Analytic Geometry, second edition (McGraw-Hill)

18.01A Supplementary Notes (sold by Copy Tech, Basement Bldg. 11)

Lectures: T-Th 1, F 2 26-100 18.01A A. Mattuck 2-241 3-4345 mattuck@mit.edu

18.02A John Bush 2-392 3-4387 bush@math.mit.edu

Administrator: Stevie Gallarelli 2-108 3-4977 nonna@math.mit.edu

Recitations: M-W; change section on Stellar (cf. "18.01A Website" below)

Problem Sets: Given out Thursdays in lecture; available afterwards on 18.01A website; due on Thursdays, 12:45 in 2-106; returned in recitation following Monday with solutions; unclaimed sets put in horizontal file in 2-108 (left wall) after recitation Monday.

18.01A Website: <http://math.mit.edu/~apm/1801A.html>

Has problem sets, practice exams, and corrections in *pdf* format, and link to Stellar website, where you can check your record (grades on exams and problem sets).

Tutoring: 2-102 Mon-Tues-Wed-Thurs: 3-5 and 7:30-9:30 PM. (Starts second week.)

Exams: 18.01A: One hour-exam; two-hour evening final (dates on syllabus).

18.02A (first half): One hour-exam; two-hour midterm during finals week.

Students who fail an hour-exam receive e-mail that evening; they can take a make-up exam once during certain hours the following week. (No make-ups for the two-hour exams.)

Grading: A grade is given for 18.01A, and a temporary grade for 18.02A (first half). Each grade is based on a cumulative total score for that half-semester. For this, each problem set counts 35-45, each hour-exam 100, each two-hour-exam 200.

In addition to this, to pass 18.01A (i.e., be at level C- or better), you must pass the two exams and make a reasonable effort on three of the four problem sets. Students who do not pass 18.01A Exam 1 (or its makeup) must transfer to 18.01.

Exceptions to these for borderline fails will be considered on a case-by-case basis.

18.02A second half: Offered twice: IAP (Jan.), and the first half of the spring semester. The final grade for 18.02A will be the average of the grades for each half. (Note that if you finish 18.02A in the spring, a letter grade (ABC/NR) will appear on your transcript.)

Questions: Academic problems and concerns: Recitation Teacher

Problems with exams or homework (away games, illness, emergencies): Administrator

18.01A SYLLABUS

W	Sept. 3	0.	Rec.: Linear and quadratic approximations
Th	Sept. 4	1.	Higher order approximations; Taylor series
F	Sept. 5	2.	Indeterminate forms $0/0$, ∞/∞ ; L'Hospital's rule
Tu	Sept. 9	3.	Definite integral; First fundamental theorem; applications

Th	Sept. 11	4. Second fund. theorem; $\ln x$ Prob. Set 1 due
F	Sept. 12	5. Geometric applications: volumes, arc length, surface area
Tu	Sept. 16	6. Other applications: work, average value
Th	Sept. 18	7. Integration by direct and inverse substitution; trig. integrals Prob. Set 2 due
F	Sept. 19	8. Partial fractions decomposition
Tu	Sept. 23	9. (<i>Holiday Mon.</i>) Integration by parts
Th	Sept. 25	Exam 1 , covering Lectures 0-9
F	Sept. 26	10. Improper integrals
Tu	Sept. 30	11. Infinite series: integral test, convergence of $\sum 1/n^k$
Th	Oct. 2	12. Geometric series; ratio test Prob. Set 3 due
F	Oct. 3	13. Power series, radius of convergence; short-cuts to expansions
Tu	Oct. 7	14. <i>Holiday Mon.</i> Intro. to probability: discrete random variables, Poisson
Th	Oct. 9	15. Continuous random vars; standard deviation Prob. Set 4 due
F	Oct. 10	16. Normal distribution; applications
Tu	Oct. 14	17. Continuation of probability
Th	Oct. 16	18. Review. Two-hour final in evening , covering 0-18 (<i>No class Fri.</i>)

18.02A SYLLABUS: FIRST HALF

Vectors

M	Oct. 20	19. Recit: Intro. to vectors
Tu	Oct. 21	20. Scalar (dot) product
Th	Oct. 23	21. Determinants; cross product
F	Oct. 25	22. Matrices; inverse matrices
Tu	Oct. 28	23. Theorems about square systems; Cramer's rule, eqns. of planes
Th	Oct. 30	24. Parametric eqns: eqns. of lines and curves; cycloid Prob. Set 5 due
F	Oct. 31	25. Vector derivatives
Tu	Nov. 4	26. Applications; Kepler's second law
Th	Nov. 6	27. Exam 1 , covering Lectures 19-26

Partial Differentiation

F	Nov. 7	28. Intro to fens. of sev. vars.; graphs, level curves, partial derivs, tangent plane approximation
Th	Nov. 13	29. <i>Holiday Mon., Tues.</i> 2D-Directional derivative, gradient.
F	Nov. 14	30. Applications in 3D - contour surfaces, tangent planes.
Tu	Nov. 18	31. Max-min problems; method of least squares
Th	Nov. 20	32. Second derivative criterion. Lagrange multipliers. Prob. Set 6 due
F	Nov. 21	33. Chain rule and applications.
Tu	Nov. 25	34. Chain rule for non-indept. variables

Double Integration

Tu	Dec. 2	35. <i>Holiday Th., Fri.</i> Double and iterated integrals in rect. coord's
Th	Dec. 4	36. Polar coordinates. Double integrals in polar coord's, applications Prob. Set 7 due
F	Dec. 5	37. Change of variable in double integrals; jacobians
Tu	Dec. 9	38. Continuation and review

Two-hour midterm exam during finals week covering 18.02A first half (19-38)