Class meetings: Tuesday and Thursday 11:00–12:00, Friday 2:00–3:00 in 2-142.


Lecturer: David Vogan, 2-243 (x3-4991, dav@math.mit.edu). Office hours are Monday 3–4 and Tuesday 1–2, or by appointment.

Recitation meetings: Monday and Wednesday 2:00–3:00 in 2-142.

Recitation instructor: Lionel Levine, 2-335 (x3-7905, levine@math.mit.edu).

Tutoring is available in 2-102 Monday through Thursday 3:00–5:00 and 7:30–9:30 (starting the second week of class).

Homework assigned most Thursdays in lecture. Due in recitation the following Wednesday. Late work will not be accepted; if there’s a medical reason for missing a problem set, please tell me.

Each assignment begins with “Part 1,” consisting of problems from the text and the supplementary notes emphasizing the basic techniques you are learning. Often these problems have brief solutions in the back of the notes or the back of the text. You need to work the problems without consulting these solutions, or the work will have no value in preparing for the exams.

“Part 2” of each problem set consists of problems requiring more time and thought. The goal here is see how calculus can help you understand the world a little differently; and perhaps also to see how your knowledge of the world can help you to understand calculus a little differently.

Exams: One-hour exams during the lecture hour on Thursday, February 17, Friday, March 11, Friday, April 8, and Friday, April 29. Final exam Wednesday, May 18, 9:00–12:00 in 2-142. The exams will be closed book, and calculators will not be allowed.

Grading: Approximate weighting: problem sets 25%, hour exams 50%, final exam 25%.

Syllabus

In the reading assignments, “G1” means section G1 of the Supplementary Notes; “2.1–2.4” means sections 2.1, 2.2, 2.3, and 2.4 of Simmons. Doing the reading before class offers you the priceless (©MasterCard) possibility of catching the lecturer in an error.

1. Differentiation

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<td>Lecture 5</td>
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2. Applications of Differentiation

Fri 2/18 Lecture 9 Linear and quadratic approximation A
Tues 2/22 No Lec. Monday classes; Recitation at 11:00.
Thurs 2/24 Lecture 10 Curve sketching 4.1, 4.2
Fri 2/25 Lecture 11 Max-min problems 4.3, 4.4
Tues 3/1 Lecture 12 Related rates 4.5
Thurs 3/3 Lecture 13 Newton’s method and other applications 4.6, 4.7
Fri 3/4 Lecture 14 Mean value theorem, inequalities 2.6 to 77, MVT
Tues 3/8 Lecture 15 Differentials, antiderivatives 5.2, 5.3
Thurs 3/10 Lecture 16 Differential equations, separation of variables 5.4, 8.5
Fri 3/11 Lecture 17 Exam 2

3. Integration with applications

Tues 3/15 Lecture 18 Definite integrals 6.3 to (4), 6.4, 6.5
Thurs 3/17 Lecture 19 First fundamental theorem of calculus 6.6, 6.7 to 215
Fri 3/18 Lecture 20 Second fund. thm. of calculus, defn. of log PI, FT
3/21-3/25 Spring Break
Tues 3/29 Lecture 21 Areas between curves, volume by slicing 7.1–7.3,
Thurs 3/31 Lecture 22 Volume by disks and shells 7.4
Fri 4/1 Lecture 23 Work, average value, probability 7.7 to 247, AV
Tues 4/5 Lecture 24 Numerical integration 10.9
Thurs 4/7 Lecture 25 Further applications, review for Exam 3 Exam 3
Fri 4/8 Lecture 26

4. Techniques of integration

Tues 4/12 Lecture 27 Trigonometric integrals 10.2–10.3
Thurs 4/14 Lecture 28 Inverse substitution, completing the square 10.4
Fri 4/15 Lecture 29 Partial fractions 10.6, F
Tues 4/19 Holiday
Thurs 4/21 Lecture 30 Integration by parts, reduction formulas 10.7
Fri 4/22 Lecture 31 Parametric equations, arc length, surface area 17.1, 7.5, 7.6
Tues 4/26 Lecture 32 Polar coordinates, area in polar coordinates 16.1, 16.2, 16.3 to 570, 16.5
Thurs 4/28 Lecture 33 Review for Exam 4 Exam 4
Fri 4/29 Lecture 34

5. Improper integrals, infinite series

Tues 5/3 Lecture 35 Indeterminate forms, L'Hôpital’s Rule 12.2, 12.3
Thurs 5/5 Lecture 36 Improper integrals 12.4, INT
Fri 5/6 Lecture 37 Infinite series, convergence tests 13.3, 13.5
Tues 5/10 Lecture 38 Taylor series 14.4 to 498
Thurs 5/12 Lecture 39 Review for Final Exam; last class

May 16–20: Final Exam scheduled by Registrar