

Welcome To Math 21a

Multivariable Calculus

<http://www.courses.fas.harvard.edu/~math21a/>

Course Head

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This Week's Office Hours:

- Today: 9:00–11:00 AM, 2:00–3:00 PM
- Tomorrow: 10:30–11:30 AM
- Friday: 1:30–2:30 PM

Prerequisites for Math 21a

Prerequisites:

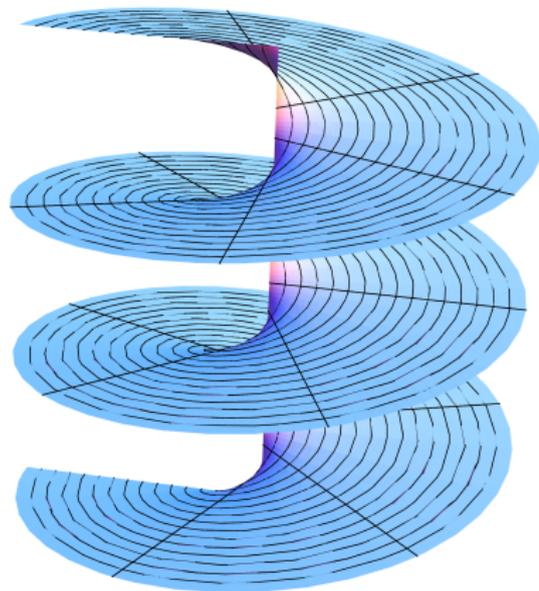
- Math 1b
- A satisfactory score on the Math Placement Exam

Questions? See a math adviser

You must section for this course

<http://www.math.harvard.edu/sectioning/>

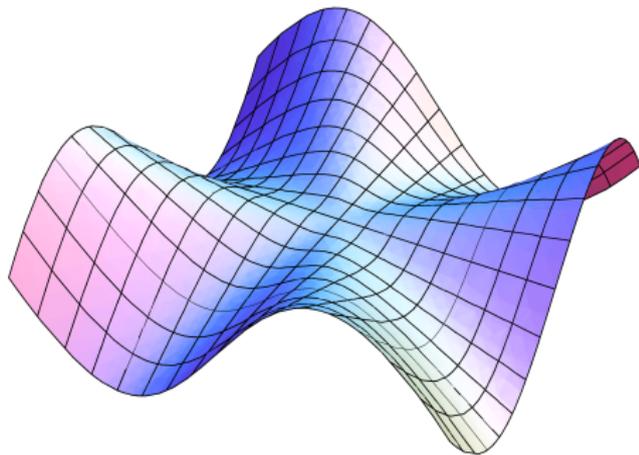
The Geometry of Space



- Lines, planes, curves, and surfaces in three-dimensional space
- Parametric representation of curves and surfaces

Functions of Several Variables

- Differentiation
- Partial differential equations and their solutions
- Gradients, the chain rule, and directional derivatives
- Finding extrema



Integration & Integral Theorems

- Integration of functions of more than one variable

$$\oint_C P dx + Q dy = \iint_D \left(\frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y} \right) dA$$

- Integrating on curves, surfaces, and solids

$$\oint_C \mathbf{F} \cdot d\mathbf{r} = \iint_S \text{curl } \mathbf{F} \cdot d\mathbf{S}$$

- Versions of the Fundamental Theorem of Calculus

$$\iint_S \mathbf{F} \cdot d\mathbf{S} = \iiint_E \nabla \cdot \mathbf{F} dV$$

Sectioning

- To enroll in Math 21a, you **must** section by noon tomorrow!
- See <http://www.math.harvard.edu/sectioning/>.
- See a math adviser if you need help picking a course.

The Textbook

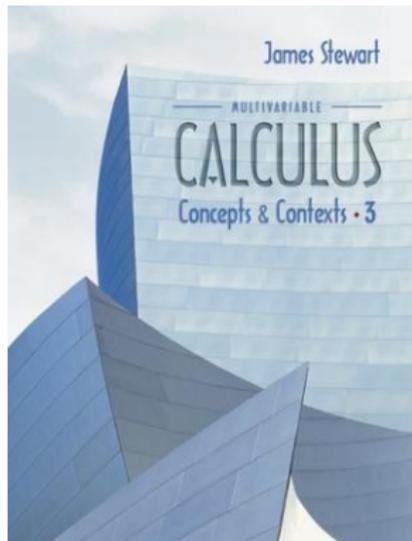
*Multivariable Calculus:
Concepts & Contexts, 3e*

by James Stewart

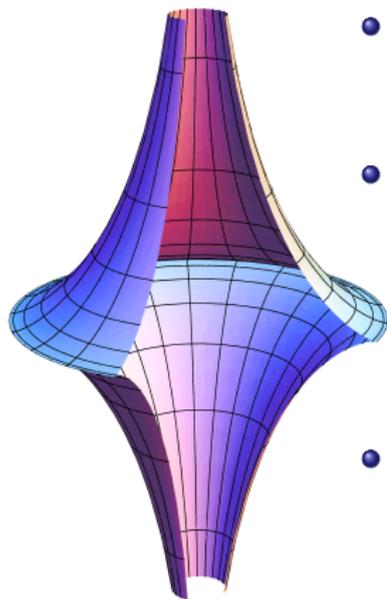
ISBN 0-534-41004-9

Careful! There are many versions:

- single variable only
- multivariable only (Ch. 8–13)
- both single and multivariable (Ch. 1–13)



Mathematica



- A state-of-the-art Computer Algebra System
- May be downloaded from FAS Information Technology or used in the FAS Computer Lab:
`www.fas-it.fas.harvard.edu`
- We will have several short projects meant to familiarize you with this valuable tool

Exam Dates

Mark Your Calendars!

- Midterm 1: Thursday March 5th, 7:00–9:00 PM
Science Center Hall D
- Midterm 2: Tuesday April 7th, 7:00–9:00 PM
Science Center Hall C
- Final Exam: Monday, May 18th (Time & Room TBA)

No calculators or notes are permitted during exams.

Homework

- Everyone does the same homework
- Two homework schedules: MWF versus TTh
- Homework is due at the beginning of class
- **No Late Homework**
- We drop your three lowest homework scores

Grading

Component	Percentage
Midterm 1	20%
Midterm 2	20%
Final Exam	30%
Homework	25%
Mathematica Labs	5%

Use The System

- Course Assistants (CAs)

Each Math 21a section has an undergraduate CA

CAs hold weekly 60-minute problem sessions

- TF Office Hours

- Math Question Center (MQC)

Our MQC will be in SC 309 this semester

Important Addresses

- Peter M. Garfield (Course Head)
garfield@math.harvard.edu
- Course web page:
<http://www.courses.fas.harvard.edu/~math21a/>
- Sectioning Info:
<http://www.math.harvard.edu/sectioning/>