# MATH UN1101
# CALCULUS I (SECTION 5) - SPRING 2019

407 MATHEMATICS BUILDING
TUES/THURS 1:10PM - 2:25PM

## People

Instructor: Henry Liu (hliu@math.columbia.edu)
Office hours: Fri 12:00pm - 2:00pm, 528 Mathematics Building (or appointment by email)
TAs: Annie Lin (zl2542@columbia.edu), Tal Zilkha (tiz2102@columbia.edu)
TA help room hours: in 502 Milstein

- Annie: Weds 2:00pm - 3:00pm and Thurs 3:00pm - 4:00pm,
- Tal: Fri 10:00am - 12:00pm.

## Textbook

James Stewart, *Calculus (Early Transcendentals)*, any edition. It will not be strictly necessary for the course, though we will follow its order of presentation of topics.

## Grading policy

The final grade will be based on assignments (20%), two in-class midterm exams (20% each), and a final exam (40%).

(1) Midterm 1: **Feb 19**, in class
(2) Midterm 2: **Apr 02**, in class
(3) Final exam (projected): **May 14, 1:10pm - 4:00pm**

Make-up exams will not be given.

## Homework

There will be weekly homework assignments **due in class by the start of class on Tuesdays**. (You can also drop them off before class in the drop box on the 4th floor of the Math building.). Late homeworks will not be accepted unless accompanied by a note from a doctor or a dean documenting a medical or family emergency.

Grades will be posted on CourseWorks. The lowest homework grade will be dropped. You are encouraged to discuss the homework with other students but you must write your solutions individually, in your own words.

If you need help with your assignments or with the material of the course, you are encouraged to visit the 502 Milstein help room. You can drop by whenever the help room is open.

## Schedule

| Class | Date | Material | Section(s) |
|---|---|---|---|
| 1 | Jan 22 | Functions, examples, trig functions | §1.1, 1.2 |
| 2 | Jan 24 | Exponentials, new functions from old, logarithms | §1.3, 1.4, 1.5 |
| 3 | Jan 29 | Tangents and velocities, limits, limit laws | §2.1, 2.2, 2.3 |
| 4 | Jan 31 | Squeeze theorem, vertical/horizontal asymptotes | §2.3, 2.6 |
| 5 | Feb 05 | Continuity, intermediate value theorem | §2.5 |
| 6 | Feb 07 | Derivatives, tangent lines | §2.7, 2.8 |
| 7 | Feb 12 | Derivative of polynomials, product & quotient rules | §3.1, 3.2 |
| 8 | Feb 14 | Review | |
| 9 | **Feb 19** | **Midterm 1** | |
| 10 | Feb 21 | Derivative of trig functions | §3.3 |
| 11 | Feb 26 | Chain rule | §3.4 |
| 12 | Feb 28 | Implicit differentiation, derivative of logarithms | §3.5, 3.6 |
| 13 | Mar 05 | Related rates, linear approximation | §3.9, 3.10 |
| 14 | Mar 07 | Maximum and minimum values, extreme value theorem | §4.1 |
| 15 | Mar 12 | Mean value theorem | §4.2 |
| 16 | Mar 14 | Second derivatives, convexity, shapes of graphs | §4.3, 4.5 |
| 17 | Mar 26 | L'Hopital's rule | §4.4 |
| 18 | Mar 28 | Review | |
| 19 | **Apr 02** | **Midterm 2** | |
| 20 | Apr 04 | Optimization problems | §4.7 |
| 21 | Apr 09 | Antiderivatives | §4.9 |
| 22 | Apr 11 | Areas and distances | §5.1 |
| 23 | Apr 16 | Riemann sums, definite integrals | §5.2 |
| 24 | Apr 18 | Fundamental theorem of calculus | §5.3 |
| 25 | Apr 23 | Indefinite integrals | §5.4 |
| 26 | Apr 25 | Substitution rule | §5.5 |
| 27 | Apr 30 | Areas between curves, volumes | §6.1, 6.2 |
| 28 | May 02 | Cumulative review | |
| | **May 14** | **Final exam** | |