Math 136
Class # 1
Intro to the class

Todd Quinto

Mathematics Department
Tufts University

Spring 2023

- *Section 1: 1:30-2:45 MW in BP 003*
  Zoom meeting # (if needed): 959 7339 4712, password: 290524 (but in-person is better!)
- *Section 2: 4:30-5:45 MW in JCC 160*
  Zoom meeting # (if needed): 970 3717 5775, password: 492772 (but in-person is better!)
- *Temporary Student Hours:*
  Fridays 1:30-3:00 P.M. in my office JCC 575 + by appointment.
- *TA problem sessions:* 10:30 am Fridays, room TBA

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HW 1 is posted on our Canvas main page and Gradescope. Submit it in to Gradescope by January 29 at 11:59 p.m.

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If you'd like to talk about summer research, the math major, or anything else, let me know!

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- Keep a definition and theorem sheet!

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- If you use names or pronouns that are not on SIS, please let me know. I use the *he series* pronouns.

Grading

- *Our 2 tests are worth 25% in total,* 10% for the lower grade, 15% for the higher grade.
  - *Midterm:* Open block, Wednesday, 3/1, 12:00-1:00 + upload time. At the end, you upload on Gradescope.
  - *Take-home Final:* Last week of class, due Friday, 4/28 at end of day.

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- *Individual meetings are worth 2%* I will schedule them early in the term. We can talk about how you learn, concerns about the course, and anything else you would like.

Overview of class

- Differentiation of Function from $A \subset \mathbb{R}^n$ to $\mathbb{R}^m$
  - Definition of derivative, $\mathbf{D}f$ as a matrix or linear transformation
  - Properties of $\mathbf{D}$ including Mean Value Theorem.
  - Relation of $\mathbf{D}f$ to local properties of f: Dini's Theorem (how to write the curve $f(x, y) = c$ as y as a function of x or vice versa (maybe Inverse and Implicit Function Theorems).

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  - $f : [a, b] \to \mathbb{R}$
  - $f : A \to \mathbb{R}$ where A is a bounded set in $\mathbb{R}^n$.
  - What functions are integrable
    - Continuous functions?
    - Continuous functions most places??? *Jordan Content*

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- Hilbert Space and Fourier series
  - Infinite dimensional complete inner product spaces!
  - How Fourier Series relate to Inner Product and Hilbert Spaces
  - Applications of *everything we learned* to solutions of the heat equation.

Now, it's your turn to say something
fun or surprising about yourself
if you want!