Calculus???

1 About the course

2 Learning methods

3 About me

Math 100: Differential Calculus

Sections V01/109, Lecture 1

Lior Silberman[1]

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https://www.math.ubc.ca/~lior/teaching/2122/100_F21/

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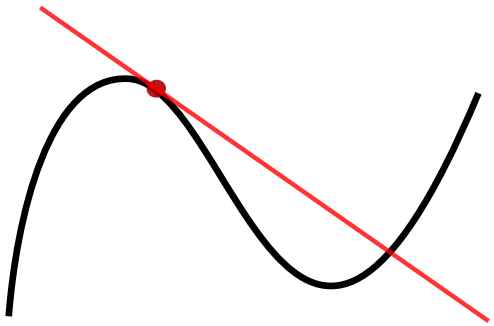
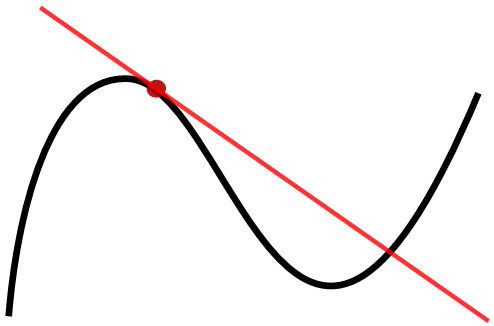
Calculus ???



What is a *Calculus*?

[2]Image due to Jacj from: `https://commons.wikimedia.org/wiki/File:Tangent_to_a_curve.svg`

Calculus ???



What is a *Calculus*?

- *Differential calculus*: A collection of methods for studying rates of change.[2]
- Language to describe nature

[2] Image due to Jacj from: `https://commons.wikimedia.org/wiki/File:Tangent_to_a_curve.svg`

Galileo says

Math 100, Lecture 1

Lior Silberman

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Philosophy is written in that great book (I mean the universe) ... but the book cannot be understood unless one first learns the language and the symbols in which it is written. This book is written in the mathematical language ... without whose help it is impossible to comprehend a single word of it; without which one wanders in vain through a dark labyrinth.

— Galileo Galilei, The Assayer, 1623.

HG Wells says

... the new mathematics is a sort of supplement to language, affording a means of thought about form and quantity and a means of expression, more exact, compact, and ready than ordinary language. The great body of physical science, a great deal of the essential fact of financial science, and endless social and political problems are only accessible and only thinkable to those who have had a sound training in mathematical analysis, and the time may not be very remote when it will be understood that for complete initiation as an efficient citizen ... it is as necessary to be able to compute, to think in averages and maxima and minima, as it is now to be able to read and write.

— HG Wells, Mankind in the Making, 1903.

Today's Goals

1. About the course
2. Learning methods
3. About me
4. Math: introduction to limits

1(a) About the Course: Course plan

- Limits and limit laws;
- Differentiation and the derivative;
- Application of the derivative;
- Taylor approximation.

1(b) About the Course: Components of the course

- Classes (8:00-9:30 / 9:30-11:00, MATH 100)
- Precalculus review [5%]
- Weekly online homework (due 11:59pm Tuesdays) [20%]
  - WebWork 0 (not graded) open now – do it as soon as possible
  - WebWork 1 due September 14
- Offline homework = Practice problems (not for submission) [0%]
- In-class Midterm (November 4) [25%]
- Final exam [50%]
- Piazza, Office hours

2(a) Learning: Put in the work

Learning cycle

1. Read before class: see Lecture-by-lecture table
2. During class: mindful learning
3. After class: practice problems + WebWork

Advice

- Stay caught up
- Put in the hours (2-3 hours at home for each hour in class)
- Online homework: don't take the easy way out.
- Mindful practice in and out of class.

Mindful class time

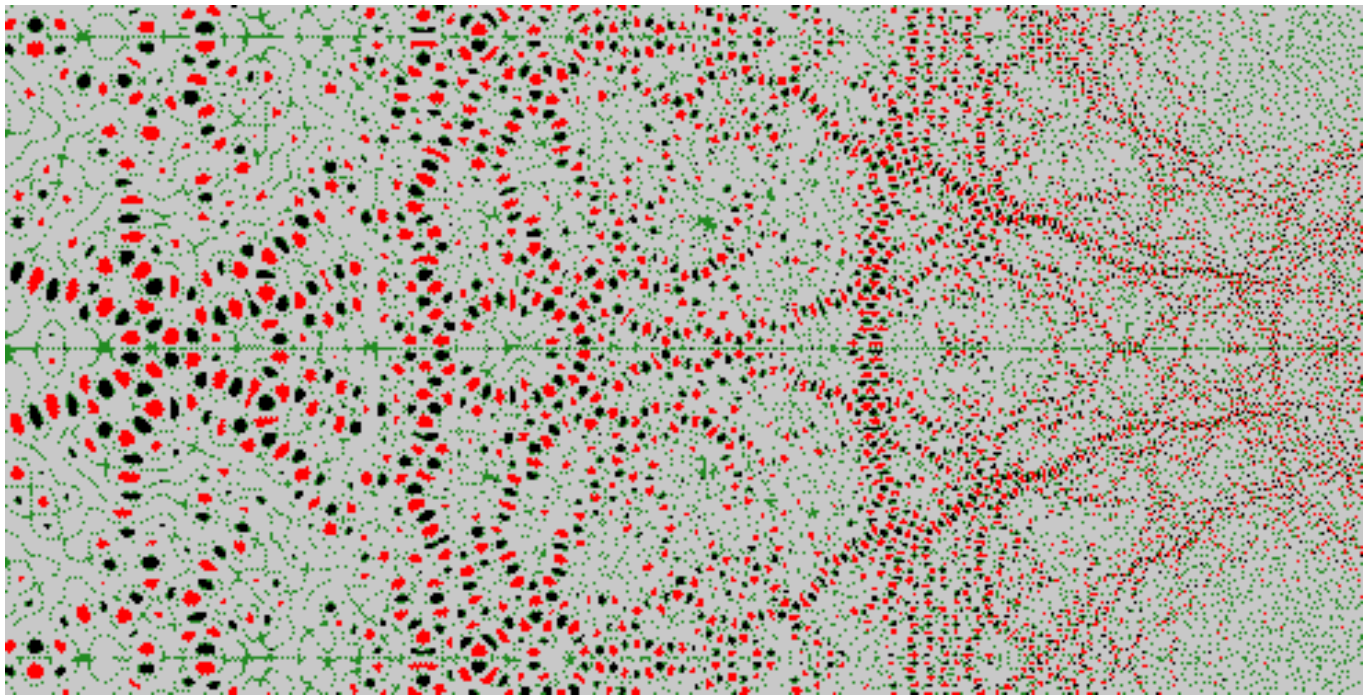
Abducted by an alien circus company, Professor Doyle is forced to write calculus equations in centre ring.

(Gary Larson, "The Far Side", 15/9/1992)

- Learn *ideas* not solutions.
  - Pay attention to *cues*
  - (mostly) Ignore algebra
- *Solve worksheet problems* to trigger *thinking*.
- ***ASK QUESTIONS!!***

Getting help

- Piazza
- Office hours:
  - ***Everyone is encouraged to come and ask questions***
  - Mondays 12:30-14:00 @ Irving Barber Library
  - Tuesday 21:30-23:00 @ Zoom
  - Thursdays 11:00-12:30 @ MATX 1112
- Math Learning Centre

About me

- Dr. Silberman (Li'$\overline{\text{or}}$ $\overline{\text{Zil}}$berman)
- Email: `lior@math.ubc.ca`, Office: MATX 1112.
- Work: Number Theory, Random Structures, ...