Math 100: Differential Calculus

Sections 1C3, Lecture 0

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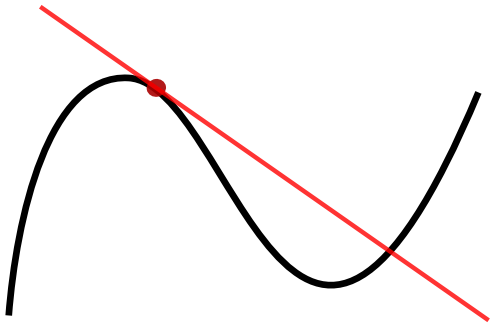
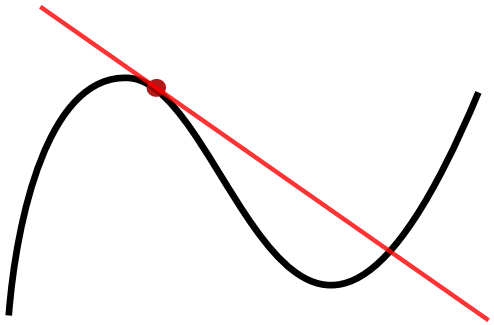
Calculus ???



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 the world around us

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Galileo says

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

Calculus???

1 About the course

2 Learning advice

3 About me

... 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

1(a) Getting information

1. Course-wide information: on Canvas
   - Main page (includes Syllabus – must read!)
   - WebWork – system for online homework & quizzes
   - Textbook (CLP Notes)
   - Written homework submission
   - Gradebook
2. Section-specific information
   - Section page
   - lecture-by-lecture table

1(a) About the Course: Course plan

- Asymptotics, limits, limit laws;
- Differentiation and the derivative;
- Application of the derivative;
- Taylor approximation.

1(b) About the Course: meetings

1. Large Classes
   - Thursdays 14:00-15:50 at Woodward IRC 2
2. Small classes
   - Various days of the week and places
3. Piazza
4. Office hours

1(c) About the Course: grades

Final mark is composed of:

1. Participation [10%] including
   - Diagnostic test
   - Two midterms for feedback
   - Small class participation
2. 10 online homework assignments [5%]
   - WebWork tutorial (not graded) open now – do it as soon as possible
   - WebWork 1 due September 22
3. 10 online quizzes [15%]
   - Also done on Webwork
   - Can retry through the term
   - **Number of perfect quizzes affects final mark** (see Syllabus)
4. Written homework assignments [$5 \times 4\% = 20\%$]
5. Final exam [50%]

The learning cycle

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

Advice

- Stay caught up
- Put in the hours (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

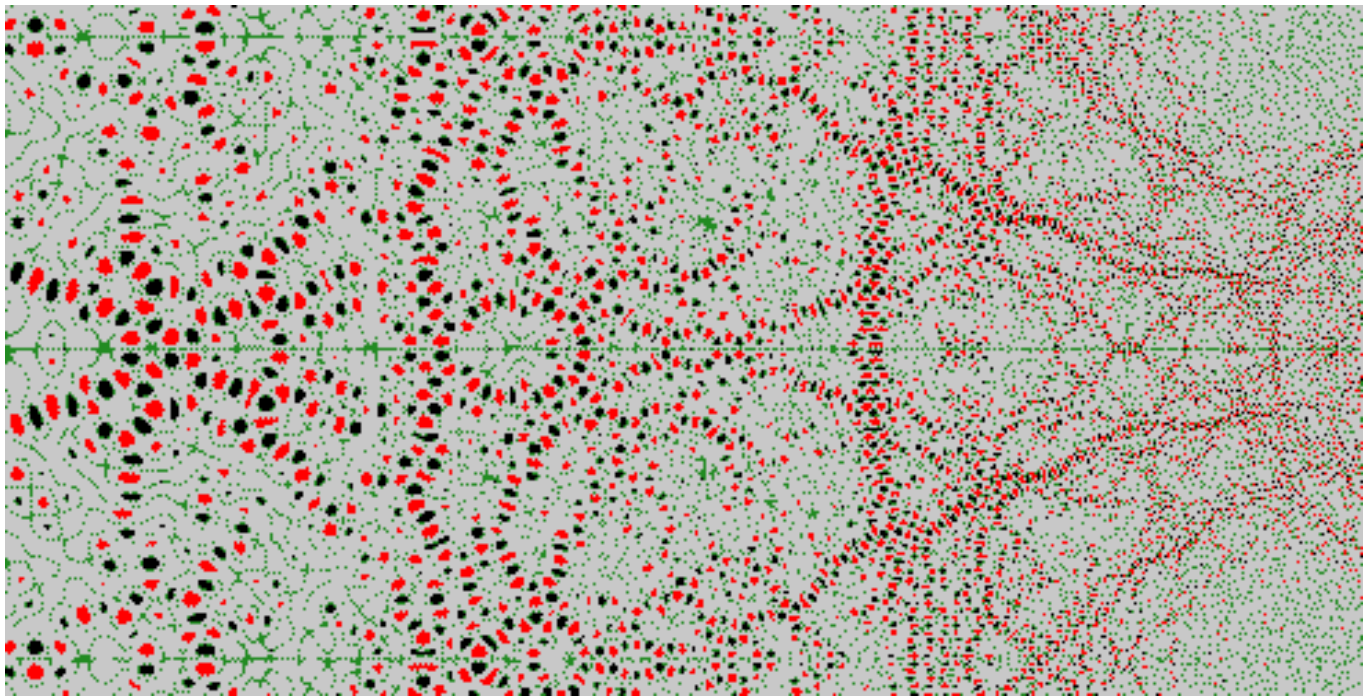
Abducted by an alien circus company, Professor Doyle is forced to write calculus equations in centre ring.

(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

- Math questions: Piazza
- Administrative questions: calculus contact form
- Office hours:
  - ***Everyone is encouraged to come and ask questions***
  - Mondays 12:30-14:00 @ Irving Barber Library
  - Thursdays 11:30-12:30 @ MATX 1112
- Math Learning Centre

About me

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- Work: Number Theory, Random Structures, ...