Math 150: Calculus I

A brief (inaccurate) history of math

Lecture -n: The dawn of calculus

20 November 2023

The game of the name. . .

Newton

Leibniz

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...and calculus ?!

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Newton fled to his home in Woolsthorpe. He was bored, resented his mum and stepdad, and had nothing to do.

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- ✓Learnt to cook something besides instant noodles
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could concentrate on a problem for days without eating or drinking (or showering),

. . . and so calculus was invented.

Physics: low hanging fruit

Newton used his theory to think about physics (probably around the late 1660s/ early 1670s).

Edmond Halley (of Halley's comet) asked Newton in 1984 about the path traced by two celestial bodies assuming the law of gravitation to be an "inverse square" of the distance between them.

Newton replied that he'd calculated it years ago and had proved that it was an ellipse.

In fact, Newton had invented laws of (all kinds of) motion and used calculus to prove Kepler's (observed) "laws" of planetary motion.
Only published in 1687's "*Principia*" (*Mathematical Principles of Natural Philosophy*)

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Newton

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Leibniz's "Calculus"

Newton was not a good scientist (secretive, didn't try to learn others' work, lied about his own, and was a giant *****le).

Meanwhile Gottfried Wilhelm Leibniz, in Europe, was doing much the same work but way more publicly.

Leibniz invented a theory of infinitesimals ("differentials") and used their "calculus" to find series expansions, tangents to curves, and maxima/minima.

Resulted in basically the same kind of calculus we use today.

Leibniz's work was around the 1670s to 80s.

Newton v. Leibniz

Newton accused Leibniz of plagiarism.

By 1711, Newton was president of the Royal Society (England's national academy of sciences). As president, Newton:

- set up a commission to investigate Leibniz,
- ensured the committee never contacted Leibniz for his version of events,
- had a document published (the *Commercium Epistolicum*) showing that Newton was right.

Newton's accusations probably had some truth. But Leibniz was a much much better scientist! (Communicated findings, was intellectually honest, and used others' help/work to improve his math.)

Consequently, the calculus we use today is (mostly) Leibniz's.