Math 181

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History of Mathematics Approaches

- History via Biography

  For example the Documentry on Andrew Wiles, and Fermat.

  Who have we heard of?

  - Andrew Wiles
  - Fermat
  - Kumming
  - Sophie G.
  - etc.

  Who should we know of?

  - John Nash

    Known for game theory, but best well known for tragically being dehibilitated by Schizophrenia.

    John Nash in his biography was a bisexual man, and was denied some jobs for his sexuality.

  - Evariste Galois

    Known for Galois theory, which is a theory for studying polynomial equations. Famously proved the zero-roots of a quintic equation cannot be written as a combination of addition, subtraction, division, multiplication, and roots.

    Died around 23 from a duel. Dramatic life story. Lived during the time of the French revolution, and was interested in revolutionary politics.

  - Srinivasa Ramanujan

    Ramanujan Conjecture won a fields medal when solved.

    Grew up in India under British rule. Inspired to do mathematics and ended up unable to continue in University as a student. Wrote up some mathematical ideas he had and sent it to some British mathematicians and caught the attention of leading mathematician Hardy. Hardy recognized Ramanujan was a genius, and brought him to England to work with him. Ramanujan eventually became ill and died before 30.

    Was a famous Indian Mathematician and had a very dramatic and tragically short life story.

  - Sophie Germain (I mentioned her earlier)

    She worked on Fermat's Last Theorem. She was a female mathematician working at a time women were denied education and power in public life.

  - Emmy Noether

    She made many important contributions to abstract algebra. Noetherian ring, Noether's theorem in physics.
    Both father and brother were talented mathematicians, made contributions to Algebraic geometry, etc.

    She was also a Jewish mathematician during the rise of Nazi Germany. She ended up moving to the US to flee the Nazis. She was also in a similar situation to Sophie Germain, many women were still heavily discouraged from studying higher education.

- David Hilbert

  > Same university as Noether, posed famous problems which shaped mathematics research. Somewhat of a polymath with results in many disciplines.

- George Cantor

  > Major contributions to set theory. Multiple types of infinities, no bijections between reals and rationals.

  > Many of these people are german, why is that? What was going on in Germany to spur such a culture?

- Alan Turing

  > Famously a homosexual mathematician who was persecuted by the British government. He was chemically sterilized and his contributions were hidden for many years.
  >
  > Famously broke the Nazi Enigma code during the second world war.
  >
  > Also made many foundational contributions to theoretical computer science, Turing Machines, P and NP.
  >
  > Contributions to mathematical biology.

- Ada Lovelace

  > Analytical machines, and general computing. Considered by some to be the first programmer.
  >
  > Predates electronic solid state computing. Also predates programming languages as a concept.
  >
  > Related to famous poet Byron.

  > What differentiates fields? Early Computer Scientists were mathematicians. Early mathematicians were philosophers.

- John von Neuman

  > Helped invent game theory, one of the first programmers (von Neuman architecture). Many other contributions.

- John Conway

  > Automata, Monstrous Moonshine Conjecture, etc. Good speaker and teacher.

- Pythagorus
- Archimedes
- Euclid
- Euler
- Newton
- Bernoulli

Which people could we study in the history of Mathematics?

- Professors of modern-ish universities
- Amateur Mathematicians with Large Contributions

> People like Fermat who was read by professors and respected.

- Layperson math

> What was taught and who was learning?

- Lecturers and Math communicators?

> Grant Sanderson
> Berkand Polster

- Commercial or Industrial math

> Investment
> Engineering
> NSA
> Bell Labs
> Microsoft, etc.

- Public Intellectuals

> Lagrange
> Bertrand Russell
> etc.

- Think tanks

> OpenAI
> Research Institutions

- Multidisciplinary Math

> Artists
> Muscicians
> Computer Scientists
> Physicists

Concluding

> Thoughts on Mathematical Movie posters.
>
> - A Beautiful Mind (John Nash)
>   - Sad
>   - Smart Brain man
>   - Individual
>   - Personal over factual
>   - Weird + exceptional
>   - Big name actors with contracts
>   - Mental health
>   - Notable abscence of mathematics
> - The Imitation Game (Alan Turing)
>   - Individual
>   - Weird man

- – Big smarty brain
- – Lack of mathematics
- – similar framing to previous poster
- The Man Who Knew Infinity (Ramanujan)
  - – Not looking at viewer
  - – white background
  - – Two people (Hardy and Ramanujan)
  - – Mathematics on the poster
  - – Why is Good Will Hunting on the poster lmao
  - – First non-white man depicted so far, only one where the main character isn't alone.
- Hidden Figures
  - – Shot like action poster
  - – Less emphasis on "extrodinary mind"
  - – Full body shot
  - – Setting in the background

How do people like those in Hidden Figures, become known? How do we build biographies?