How (not) to Give a Math Talk

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What is good exposition?

Think about **math communicators** that you've learned from.
What makes them good at exposition?

These are the same skill.

Think about **performers** that you've seen on stage.
What makes them good performers?

A math talk is a performance

Let's say you're preparing for a performance. (theater, music, dance, etc.)

How should you prepare before the performance?

- Memorizing your lines
- Getting the choreography of your movements into your body
- Rehearsing with your peers
- Rehearse in front of an audience (dress rehearsal)
- Rehearse in the space you'll be performing in

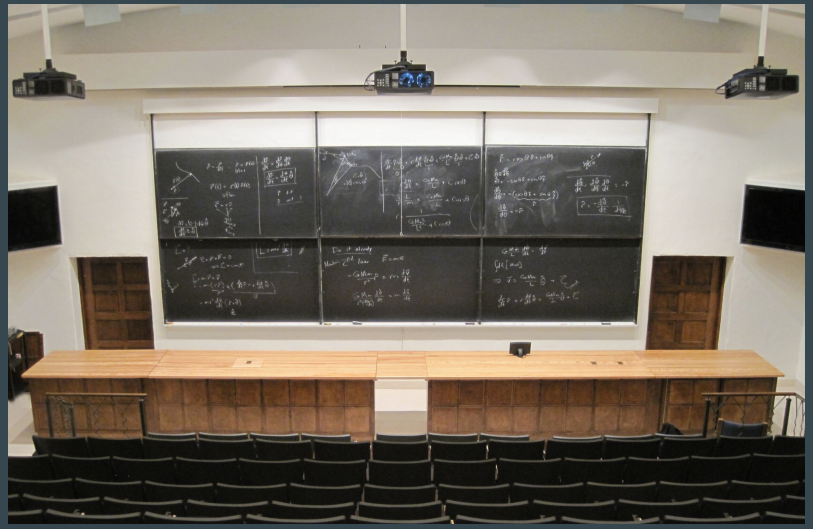
How should you prepare on the day of?

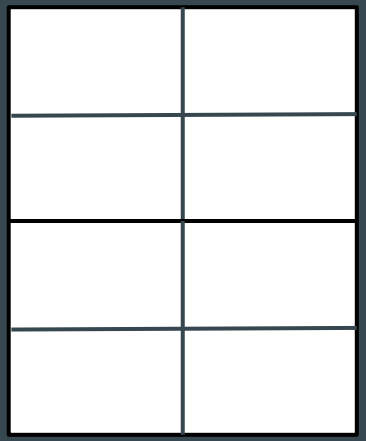
- Sleep, eat, hydrate (I will superstitiously eat a banana before every big performance)
- Trust that you're prepared and ready for the performance
- Remind yourself that the audience wants to see you succeed

A math talk is exactly the same.

A math talk is a performance

- Memorize your opening paragraph, transitions, and closing paragraph
- Plan your blackboard choreography
  - What goes where on the blackboard?
  - When do you start a new board?
  - Do you split one board into multiple?
  - When do you look at the board, and when do you look at your audience?
  - Don't stand directly in front of the blackboard
  - Don't mumble towards the blackboard
- Practice in front of your peers
- Practice in front of an empty room
  - Bonus: videotape yourself!





A math talk is a story

"Make the first ⅓ of your talk elementary so that everyone can follow,
the second ⅓ technical to impress the experts in the audience, and
the last ⅓ stratospherically sophisticated to show everyone you're a bloody genius."

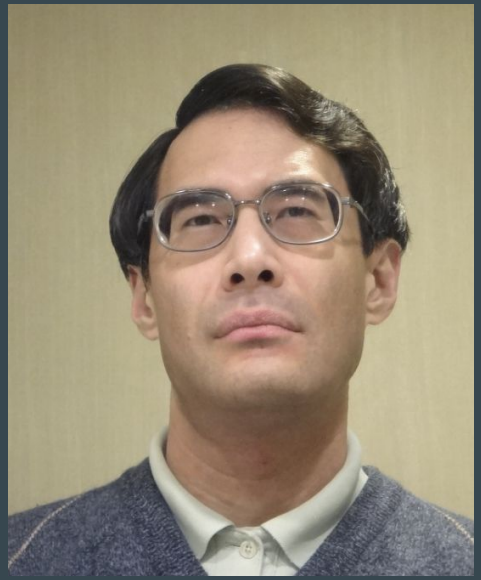
This is bad storytelling.

A math talk is a story

- Be clear on what your story is **about**.
  - What is the moral of your story?
  - What is the main takeaway you want your audience to have?
  - The main theorem you want to show off?
  - The new perspective on an old subject that you want them to appreciate?
- Be clear on the **structure** of your story.
  - What is each chunk of your presentation doing?
  - How are you transitioning between chunks?
  - How are you signposting in earlier chunks for ideas that will come up in future chunks?

These talks are for you, not for us. Have fun and don’t take yourself too seriously :)

The tale of Shinichi Mochizuki



One important aspect of such non-ring/scheme-theoretic filters is the property that they are **incompatible** with various constructions that depend on the **ring structure** of the theaters that constitute the domain and codomain of such a filter. From the point of view of the present series of papers, perhaps the most important example of such a construction is given by the various **étale fundamental groups** — e.g., **Galois groups** — that appear in these theaters. Indeed, these groups are defined, essentially, as **automorphism groups** *of some separably closed* **field**, i.e., the field that arises in the definition of the *fiber functor* associated to the **basepoint** determined by a *geometric point* that is used to define the étale fundamental group — cf. the discussion of [IUTchII], Remark 3.6.3, (i); [IUTchIII], Remark 1.2.4, (i); [AbsTopIII], Remark 3.7.7, (i). In particular, unlike the case with ring homomorphisms or morphisms of schemes with respect to which the étale fundamental group satisfies well-known *functoriality* properties, in the case of non-ring/scheme-theoretic filters, the only *"type of mathematical object"* that makes sense *simultaneously* in both the domain and codomain theaters of the filter is the notion of a *topological group*. In particular, the only data that can be considered in relating étale fundamental groups on either side of a filter is the **étale-like structure** constituted by the underlying **abstract topological group** associated to such an étale fundamental group, i.e., devoid of any *auxiliary data* arising from the construction of the group *"as an étale fundamental group associated to a* **basepoint** *determined by a geometric point of a scheme"*. It is this fundamental aspect of the theory of the present series of papers — i.e.,

Mind the gap: the Mochizuki controversy

6 April, 2021 José María Tornero Uncharted waters 2

New Scientist

ABC conjecture: Mathematicians are bitterly divided over a controversial proof

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Mar 28, 2024

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[Math] Mochizuki and the abc-Conjecture: War At the Fringes of Pure Mathematics

Long

“Shinichi” ~ “真一” ~ “Truth First”

The purpose of mathematics is not just to be correct, but to be **convincing**.

(Sometimes) More is Less

Average Information Absorption Rate of the Human Brain, in Definitions per Hour:

- 6

$\therefore$ In a < 15-minute talk you should only give at most 2 definitions.

Avoid complex notation: after two slides/chalkboards no-one is going to remember what H^{n-i}(X, Q_l) means

Don't prove things that take more than 3 lines to say.

To do this: handwave; omit; lie.

Ring-Fencing

Recency Effect: The impression your audience takes away is the most recent one.

∴ You should block out the last 10-20% of your talk for something your audience will enjoy and remember!

Do NOT go over time!

Better to stop mid-sentence than to go overtime talking about “essential material”.

In a blackboard-lined study at home, Bohr watches son Aage write out a calculation while grandson Tomas creeps in unnoticed.