27 Projects

CHAPTER

Tips on Talking about Mathematics

It's not easy to talk about mathematics to other people. In this section, we present some tips that we find helpful when we present a talk to undergraduates.

Let's say someone has just asked you to give a talk about mathematics to undergraduates. Here's what you need to do:

- Thank them, and say you'd love to. Then do the rest of the things below.
- Find out who the audience is and what they know.
- Pick an interesting topic. Find out about the history of the topic, the main players in the field, and the main results.
- Now that you have your topic, you need to write the talk. Start with something everyone is interested in. This could be the history of what you plan to talk about, or it could be an interesting related result. Then motivate the question you are interested in looking at, build up the talk, and remember to find a good conclusion for it.
- As you write your talk, keep the level of the audience in mind. Do not use terms that your audience will not understand. If they

haven't heard certain words you will have to define them, which brings us to our next point: the more terms you have to define, the more people you will lose. Pick a topic that doesn't require a lot of introduction.

- You need to decide whether you will use transparencies, the computer, or the blackboard. Each has its advantages and disadvantages. We'll run through each below.

1. *Blackboard.* If you use the blackboard, you'll most likely move at the right speed for the audience. It's also livelier than the other methods. On the other hand, you should absolutely not rely on your notes. Therefore, if you give a talk using the blackboard, you'll need to know what you are going to say and when you are going to say it. You'll need to watch where you write things, and you shouldn't erase something you want the audience to look at. Make sure that you move away from the board so that everyone can see what you wrote. If your handwriting is illegible, think about using transparencies or the computer.
2. *Transparencies.* Unless you are very careful, you will probably move too quickly for the audience. You'll probably also stand in front of the transparency from time to time, blocking the audience's view. If you are aware of these potential problems, you can correct them. For example, you can use two overheads. You should not write too much on one transparency, and you should always be aware of where you are standing. Find out how big the room is, and make sure that someone in the back of the room will be able to see what you have written. The advantage of transparencies or the computer is that you'll have all your diagrams and pictures in place, and you'll have an outline of your talk with you. So the main disadvantages are that your talk may become monotonous and that it's possible to move so quickly that your audience won't be listening. These are pretty big disadvantages.
3. *Computer.* In many ways, using the computer to give your talk is similar to using transparencies. Many of the advantages and disadvantages are the same. You can liven up the talk by adding relevant photographs of places, manuscripts, or people.

You might even add a video clip. Just make sure that these "attention getters" are relevant and well incorporated.

4. *Blackboard, Transparencies, and Computer.* One thing you can do is combine two or three of these methods of presentation. In a talk for undergraduates, it's nice for them to have something to look at from time to time, other than the speaker.

Pick the method you are most comfortable with and that you like the best. Then work around the disadvantages.

- So now you have your topic, your talk, and a method of presentation. You're done, right? Um ... no. You still have to present the talk. Surprisingly, the hardest part of the talk is timing. We've alluded to this already in our discussion on transparencies, but there's more to be said.
- Find out how long the talk is. If it's twenty minutes, talk for twenty minutes. (No one will complain if it's eighteen minutes, and everyone will complain if it's thirty.) There is only one way to know how long your talk is: practice it.
- The best way to practice a talk is to give it to yourself once. Fix the things you realize need fixing. Then try to find an audience of two people, one who knows what you are talking about and one who does not. Ask them if you can present the talk to them. Listen to their comments and use them to improve your talk.
- Write an interesting, but truthful abstract. The abstract should indicate the level of the talk.
- Before you give your talk, ask if you can see the room that you will speak in. Check that everything you need is there.
- Make sure that everyone in the room can hear you when you speak. When you give the talk, look at the audience. They'll let you know how you are doing.

There are other articles on how to talk about mathematics ([55], [33]), but these are primarily aimed at graduate students or professional mathematicians. Of course, many of the tips are the same, because many of the mistakes people make—whether talking to undergraduates, graduate students, or professors—are the same.

Appendix A

Checklist for Scientific Presentations

Table A-1. Checklist for scientific presentations.*

Speech

- Necessary information conveyed?
- Audience targeted?
- Terms defined?
- Assertions supported?
- Tone controlled?
- Examples given?

Structure

Organization of Beginning
- Scope defined?
- Topic justified?
- Proper background given?
- Talk memorably mapped?

Organization of Middle
- Divisions of middle logical?
- Arguments methodically made?

Organization of Conclusion
- Main points summarized?
- Closure achieved?

Transitions
- Beginning→middle?
- Between main points of middle?
- Middle→ending?

Emphasis
- Repetition used effectively?
- Placement used effectively?

Presentation Slides

- Slides orient the audience?
- Slides are clear to read?
- Slides have proper level of detail?
- Slides show key images?
- Slides show key results?
- Slides show talk's organization?

Delivery

- Speaker controls nervousness?
- Speaker shows energy?
- Speaker exudes confidence?
- Voice engages?
- Speed is appropriate?
- Filler phrases ("uh") are avoided?
- Eye contact made?
- Movements contribute?
- Equipment handled smoothly?
- Questions handled convincingly?
- Questions handled succinctly?
- Time is appropriate?

*Not every item on this list applies to every presentation.