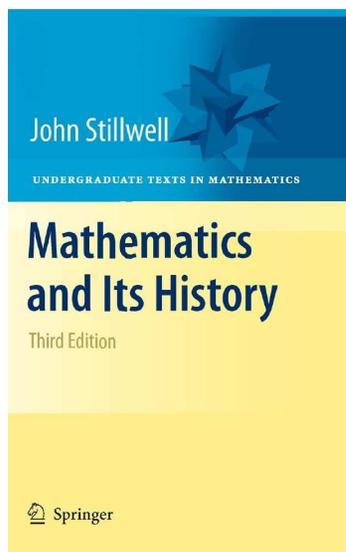


Lecture 1: Mathematics

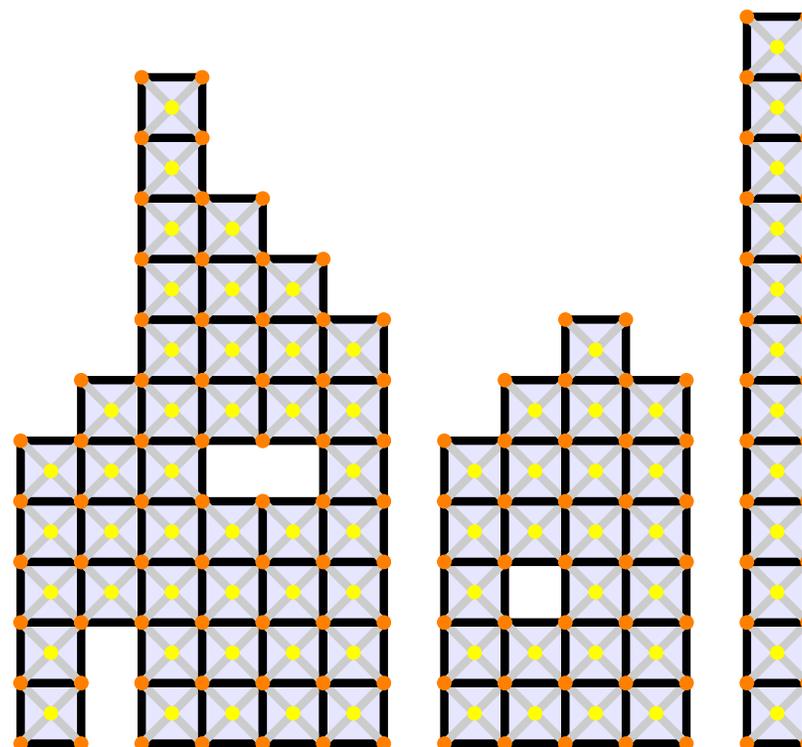
In this first lecture, we want to get an idea about what kind of mathematical areas there are. Here is a plan of the lecture:

- 1 We first look at the syllabus and methodology of the course. It will follow the course developed for last year, I will however replace some things. For example, the mystery theorem from last year is replaced. It would not be a mystery theorem any more!
- 2 We first give a presentation with the title "What is mathematics?" It will show that mathematical fields emerged from basic human activities. The structure of the current mathematical fields can be organized like this. Any "mindmap" of a field is of course rather arbitrary and very "cultural". In a different planetary system, the mathematical structures would be organized differently. However, many of the structures would probably look the same. I have packaged the topics in such a way that each of the topics can occupy us for one week. I have included a nice handout from last year about this which I'm not going to rewrite.

- 3 A quick look at the textbook. Stillwell's book gives a birds eye on mathematics. It has a similar "case based" approach. Stillwell has written many good books and I think the book is a good read beside the lectures. Besides that, I think, it is a good pathway into some mathematical fields. The book contains some nice things. Just on page 22 for example there is a construction of the icosahedron, which you can do with index cards.



- 4 We will deal with a "mystery theorem", a result which illustrates some mathematical field well. It deals with a particular property of towns like seen on this picture:



The picture shows a "town" which consists of several houses. We will attach numbers called **curvatures** to the nodes of the house. The result will be that the sum of these curvatures is the number of houses minus the number of windows.

- 5 Finally, we will have a short quiz testing what we have learned.