

N. Stanton

Some Tips on How to Deal with a Hard Math Book

A math book is not a novel. Here are some tips for reading one.

- Read it slowly.
- Read it with pencil and paper, trying to work out the details and examples in the book before reading them. If the book doesn't have examples, make your own so see how what you are reading applies.
- If possible, draw a picture.
- If the book expects you to know something you learned somewhere else, review it if necessary.
- Make sure you know definitions and statements of theorems (including why the hypotheses are there). This will make following details a lot easier.
- Build a zoo of examples. When you are trying to understand something, visit the zoo to see if there's an example it applies to, and if so, what it tells you about the example. Your zoo should include an exotic animal section—negative examples, which show you what can go wrong—in addition to the more ordinary animals.
- Reread.

Here are some questions to ask yourself when you get stuck while working problems. (Notice that I said when, not if. If you never get stuck, I'm not challenging you enough.)

- What kind of problem is it? That influences how you approach it. The basic types are:
 - Concrete (specific examples);
 - Theoretical, for example problems which require you to fill in details which aren't in the book or which require you to extend the theory.

- Have you seen a similar example (in the book, in class or on homework)? If so, how did it work?
- Is there a picture you can draw? Draw it!
- Do you know exactly what you have to do? If not, read the problem carefully, figure out what everything means, and reformulate in a way that shows you exactly what you have to do.
- Can you give a general description of how to do it?
- Is there a theorem which applies?
- Is there something useful hiding in the proof of a theorem? Proofs often show you how to do things.
- Do you understand the theory? You should, and it helps you do slightly different examples from the ones you've seen.

Start your homework early. Your final version of your solution to a problem shouldn't be the same as the first sentences you write down or your first scribbling of formulas.