Tips on Reading and Doing Math¹

Tips for reading math:

1. Reading a sentence or paragraph or chapter multiple times (say somewhere between 3 and 7 times) is quite helpful, especially if you don’t think you understood every detail the first time through.

2. If you are having trouble “getting” an idea, try reading some other source (e.g., other textbook, online materials, the “Explore more on the Web” feature of E&C, etc.)

3. Do not skip words (unless you are intentionally skimming). Every word in a math text is there for a reason. If you are having trouble understanding a sentence or paragraph or problem) try reading aloud, even if you feel silly. It does help. One of the most common causes of stuckness when solving a problem is not having read the problem statement carefully enough.

4. Keep some scratch paper handy. That way you can do calculations, attempt problems fully (not in your head), record questions and ideas that occur to you, try examples, note a definition or two that you keep having to look up, and so on.

5. Don’t try to do problems in your head. Brains are made for thinking and not memory. So let the paper be the recording device, freeing up your brain for thinking.

6. Never trust a mathematical claim without verifying it yourself. Sometimes you need to read the next sentence or two to clear things up, but don’t get more than a paragraph or so beyond the last point that you understood, unless you are completely stuck. Then mark it as something that you will need to go back to, and proceed in the hopes that life will improve.

7. Ask yourself questions. What are the main points of the section/chapter you just read? Can you generate examples of the newest definitions? What are some situations in which a recently stated theorem will apply? If there seem to be extraneous words, read again—why are they there? Is a new concept similar to one you already understood? If so, how?

8. Take short breaks when you are studying to let your brain absorb and process things behind the scenes.

¹ Adapted from S. Belcastro, Discrete Mathematics with Ducks.
Questions to ask yourself when you get stuck on a problem

1. Do I truly understand what the problem is asking? Maybe I need to read it aloud or look up some of the terms.

2. Am I using the constraints introduced in the statement of the problem? They are probably there for a reason. (Example: “For all integers $n > 4$, if $n$ is a perfect square, then $n - 1$ is not a prime number.”) Related question: Am I using the criteria given in the definitions of the terms used in the problem?

3. Is there a super-easy or trivial example that I can work through? This often helps to make sure you understand the setup of the problem. Try using 0 or 1 or $n = 0$ or $n = 1$.

4. Is there a diagram that I could draw? That might help.

5. Can I break this down into a set of smaller or simpler problems?

6. Is this problem related to any theorems I know? Or does it look similar to any examples I’ve seen?

7. Am I sure that all the statements I’ve written down are correct? (Both in terms of reasoning and symbolic manipulation)?

8. Is the statement of the problem correct or true? Maybe I should be looking for a counterexample.