Tips for Reading Your Mathematics Textbook

Reading the textbook is important for succeeding academically, and this is also true in your math classes. However, reading mathematics is different from other types of reading. Getting the most out of a math textbook will require more than just skimming through the text. Below are some tips for helping you get the most from your mathematics text.

• **Focus on concepts, not exercises.** The most important material in a math textbook is found in the prose, not in the exercises at the end of the section. In the past, you may have opened your math book only when doing problem sets and exercises (looking at the rest of the book only for examples which mirror the current assigned homework). You must rid yourself of this bad habit now. Instead, set aside time to read the text when you are not working on a homework assignment. This will enable you to truly focus on the mathematical concepts at hand.

There are an infinite number of types of mathematics problems, so there is no way to learn every single problem-solving technique. Mathematics is about ideas. The math problems that you are assigned are expressions of these ideas. If you can learn the key concepts, you will be able to solve any type of problem (including ones you have never seen before) that involves those concepts.

• **Read the text more than once.** You cannot read mathematics in the same way as you would read a newspaper or a novel. Many of the ideas presented in a typical college mathematics course have confounded brilliant minds in centuries past. So it is not unexpected that you may have difficulty learning these same ideas if you quickly scan through the reading assignments only once. You should expect to go through the each reading assignment several times before you can gain a full understanding of the material.

• **When reading through for the first time, scan for big ideas.** The first time you read through a chapter of the textbook, you should be thinking to yourself: "What is the main point of the chapter?" Look for the big picture. The details are important, but you need to be aware of the forest first before focusing on the trees.

• **The second time through, fill in details.** After you get the big picture, you should then look at the details. Take some time to think about each of the definitions, theorems, and formulas you encounter (more on this later).

• **Read with paper and pen.** As you are reading through the text, you should be writing notes and verifying any parts of which you are skeptical. Check any calculations. Rewrite definitions and theorems in your own words.

See if you can come up with your own examples. Ask yourself about special cases of the theorems you read.

• **Read the narrative.** There is a story to be told in mathematics. What is the progression of ideas being told? Don't just skip to the formulas and examples, but instead follow the development of the ideas and concepts presented.

• **Study the examples.** What points do each of the examples illustrate? Some examples are extreme cases. Other examples are supposed to illustrate "typical" situations.

• **Read the pictures.** There are good reasons for the many pictures and graphs in mathematics texts. You should be asking yourself what features of the picture are important to the key concepts. Focus on how each picture illustrates a particular idea.

• **Learn the vocabulary and the language.** Pay attention to definitions and what they mean. Mathematics language is very precise, and a word in a mathematical context may have a different meaning than when it is used in everyday conversation. In mathematics, great care is taken to explicitly and precisely define the notions being considered. In addition, mathematical definitions and language are crafted in such a way to convey sophisticated notions in as simple and concise a manner as possible.

• **Learn the theorems and what they mean.** Theorems are vital bricks to building mathematical knowledge. When you see a theorem in a mathematics text, look at it very closely. What does it say? What are it's hypotheses? What implications does it have? Are there special cases you should be aware of? Can you think of examples to which the theorem applies? Can you think of examples that do not satisfy the hypotheses and the conclusion of the theorem?

• **Use the index and the appendices.** Know what every word means. Make sure that you understand all of the words and ideas. If there is a particular word which you do not know (or which you want to know better), look it up. Use the table of contents or the index to help you.

• **Make a note of things you do not understand, and ask for help afterwards.** Even after following all of the above advice, you might still find some of the ideas confusing. That is to be expected; material such as this is often hard to internalize when one first encounters it. If there is something that you do not understand, make a note of it. Write down any questions you may have. You then can bring up these issues with your instructor or a classmate.