

Study Skill #12

Reading Math Textbooks

Instructions: Complete the *How to & Eight steps* readings, then the exercises below.

1. List three tools to have with you while reading a math textbook.
 - i) _____
 - ii) _____
 - iii) _____
2. List the eight steps to follow while reading a math textbook.
 - i) _____ v) _____
 - ii) _____ vi) _____
 - iii) _____ vii) _____
 - iv) _____ viii) _____
3. List the eight actions to take if you do not understand what you are reading.
 - i) _____ v) _____
 - ii) _____ vi) _____
 - iii) _____ vii) _____
 - iv) _____ viii) _____
4. How much time do you spend reading your math textbook? Is it enough? Why or why not? _____

5. Do you study the graphs and diagrams that appear in your math textbook? Why or why not? _____

6. Do you create a page of definitions for your math class? Why or why not? _____

7. List two reasons why reading ahead is a good idea.
 - i) _____
 - ii) _____

MSTRC Tip: *Before you start any math or science textbook reading, start by reading the chapter summary first!* This will let you know what is important and what to look for when reading the sections. Read all the definitions, theorems, and concepts. Take notes; work out example problems, and leave space between the steps so that you can add explanations from the chapter reading as you start understanding them or write down questions you have and save them for your lecture, office hours or tutor(s).

How to Improve Your Reading

Reading a math textbook is more difficult than reading other textbooks. Math textbooks are written differently than your English or social science textbooks. Math textbooks contain condensed material and therefore take longer to read.

Mathematicians can reduce a page of writing to one paragraph using math formulas and symbols. To make sure you understood that same information, an English instructor would take that original page of writing and expand it into two pages. Mathematicians pride themselves on how little they can write and still cover the concept. This is one reason it may take you two to three times as long to read your math text as it would any other text.

Remember: Reading your math text will take longer than reading your other texts.

Math students are expected to know how to do their homework; however, most math students do not have a homework system. Most students begin their homework by going directly to the problems and trying to work them. When they get stuck, they usually quit. This is not a good homework system. A good homework system will improve your homework success and math learning at the same time.

How to Read a Math Textbook

The way you read a math textbook is different from traditional way students are taught to read textbooks in high school or college. Students are taught to read quickly or skim the material. If you do not understand a word, you are supposed to keep on reading. Instructors of other courses want students to continue to read so they can pick up the unknown words and meanings from context.

This reading technique may work with your other classes, but using it in your math courses will be totally confusing. By skipping some major concepts or bold-face words, you will not understand the math textbook or be able to do the homework. Reading a math textbook takes more time and concentration than reading your other textbooks.

If you have a reading problem, it would be wise to take a developmental reading course before taking math. This is especially true with reformed math courses, where reading and writing are emphasized.

Reform math classes deal more with word problems than do traditional math courses. If you cannot take the developmental reading course before taking math, then take it during the same semester as the math course.

Eight Steps to Understanding Reading Materials

There are several appropriate steps in reading a math textbook:

Step 1 *Skim the assigned reading material.* Skim the material to get the general idea about the major topics. Read the chapter introduction and each section summary. You do not want to learn the material at this time; you simply want to get an overview of the assignment. Then think about similar math topics that you already know.

Example: Skimming will allow you to see if problems presented in one chapter section are further explained in later chapter sections.

Step 2 *As you skim the chapter, circle (using pencil) the new words that you do not understand.* If you do not understand these new words after reading the assignment, then ask the instructor for help. Skimming the reading assignments should take only five to ten minutes.

Step 3 *Put all your concentration into reading.* While reading the textbook, highlight the material that is important to you. However, do not highlight more than 50 percent of a page because the material is not being narrowed down enough for future study. Especially highlight the material that is also discussed in the lecture. Material discussed in both the textbook and lecture usually appears on the test. The purpose of highlighting is to emphasize the important material for future study. Do not skip reading assignment.

Remember: Reading a math textbook is very difficult. It might take you half an hour to read and understand just one page.

Step 4 *When you get to the examples, go through each step.* If the example skips any steps, make sure you write down each one of those skipped steps in the textbook for better understanding. Later on, when you go back and review, the steps are already filled in. You will understand how each step was completed. Also, by filling in the

extra helps, you are starting to over learn the material for better recall on future tests.

Step 5 *Mark the concepts and words that you do not know.* Maybe you marked them the first time while skimming. If you understand them now, erase the marks. If you do not understand the words or concepts, then reread the page or look them up in the glossary. Try not to read any future until you understand all the words and concepts.

Step 6 *If you do not clearly understand some words or concepts, add these words to the note-taking glossary in the back of your notebook.* Your glossary will contain the bold-face words, ask the instructor for a better explanation. You should know all the words and concepts in your notebook's glossary before taking the test.

Step 7 *If you do not understand the material, follow these eight points, one after the other, until you do understand the material:*

Point 1 – Go back to the previous page and reread the information to maintain a train of thought.

Point 2 – Read ahead to the next page to discover if any addition information better explains the misunderstood material.

Point 3 – Locate and review any diagrams, examples, or rules that explain the misunderstood material.

Point 4 – Read the misunderstood paragraph(s) several times aloud to better understand their meaning.

Point 5 – Refer to your math notes for a better explanation of the misunderstood material.

Point 6 – Refer to another math textbook, computer software program, or videotape that expands the explanation of misunderstood material.

Point 7 – Define exactly what you do not understand and call your study buddy for help.

Point 8 – Contact your math tutor or math instructor for help in understanding the material.

Step 8 *Reflect on what you have read.* Combine what you already know with the new information that you just read. Think about how this new information enhances your math knowledge. Prepare questions for your instructor on the confusing information. Ask those questions at the next class meeting.

By using this reading technique, you have narrowed down the important material to be learned. You have skimmed the textbook to get an overview of the assignment. You have carefully read the material and highlighted the important parts. You then added to your note-taking glossary unknown words or concepts.

Remember: The highlighted material should be reviewed before doing the homework problems, and the glossary has to be learned 100 percent before taking the test.

How Reading Ahead Can Help

Reading ahead is another way to improve learning. If you read ahead, do not expect to understand everything. Read ahead two or three sections and put question marks (in pencil) by the material you do not understand.

When the instructor starts discussing that material, have your questions prepared and take good notes. Also, if the lecture is about to end, ask the instructor to explain the confusing material in the textbook. Reading ahead will take more time and effort, but it will better prepare you for the lectures.

How to Establish Study Period Goals

Before beginning your homework, establish goals for the study period. Do not just do the homework problems.

Ask yourself this question: “What am I going to do tonight to become more successful in math?”

By setting up short-term homework goals and reaching them, you will feel more confident about math. This also improves your self-esteem and helps you become a more internally motivated student. Set up homework tasks that you can complete. Be realistic.

Study period goals are set up either on a timeline basis or an item-line basis. Studying on a time-line basis is studying math for a certain amount of time.

Example: You may want to study math for an hour, then switch to another subject. You will study on a time-line basis.

Studying on an item-line basis means you will study your math until you have completed a certain number of homework problems.

Example: You might set a goal to study math until you have completed all the odd-numbered problems in the chapter review. The odd-numbered problems are the most important problems to work. These, in most tests, are answered in the answer section in the back of the book. Such problems provide the opportunity to recheck your work if you do not get the answer correct. Once you have completed these problems, do the even-numbered problems.

No matter what homework system you use, remember this important rule: Always finish a homework section by understanding a concept or doing a homework problem correctly.

Do not end a homework section with a problem you cannot complete. You will lose confidence, since all you will think about is the last problem you could not solve instead of the 50 problems you correctly solved. If you did quit on a problem you could not solve, return and rework problems you have done correctly.

Remember: Do not end your study period with a problem you could not complete.

Nolting, P.D. 2000. *Math Study Skills Workbook*, pp.59-62