

Tutoring and Testing Center

# MATHEMATICS STUDY SKILLS GUIDE



Strategies for Success in Mathematics

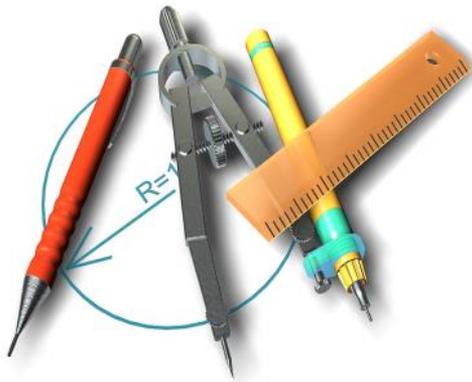


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Learning mathematics is different than learning most other subjects. In mathematics, special vocabulary and symbols are used and it is important that you not only understand the concepts being presented, but that you also apply these concepts. To be successful in mathematics, you need not only to read, attend class, and study, but you must practice the skills as often as you can. Mathematics is not a subject you learn by watching; you must DO mathematics to LEARN mathematics.

The purpose of this STUDY SKILLS GUIDE is to present you with strategies for studying that have been effective for students in mathematics classes.



Developing good study habits is one of the keys to being a successful learner of mathematics. Nine strategies are described in this guide. The more strategies you are able to use, the more effective you will be in learning mathematics.

The nine strategies included in this guide are:

1. Make a study schedule
2. Maintain a mathematics notebook
3. Read your textbook prior to class
4. Do textbook examples
5. Write the mathematical procedures
6. Re-visit previously-studied concepts
7. Summarize concepts and procedures
8. Re-read prior to a quiz or test
9. Do quiz and test corrections



Of course, attending class-and paying close attention and taking good notes in class-is also very important. Combining your classroom learning and your own studying, you can be a successful learner of mathematics.

## 1. Make a Study Schedule

Make a weekly schedule that includes work time, class time, other obligations, and family and recreational time. Then, mark off STUDY TIME. Make studying a regular activity in your life. A blank time schedule is included on the center pages of this guide. Fill out this schedule and keep it with you. If you would like, make a copy of the blank schedule provided on page 7. Fill out a new schedule each semester or whenever there is a major change in your personal obligations.

For many people, the weekends provide larger amounts of time for studying than do the weekdays. In mathematics, however, studying only on weekends is not usually effective. It is important to study math EVERY DAY, even if it is for only 30 minutes or an hour. If you must do most of your studying on one or two days of the week, break up your study periods. Study one subject for an hour, then take a break. Do some other activity for 10 to 15 minutes, then resume studying. Give a fair amount of time to all your subjects, so that none suffer from lack of studying.

Think carefully about your time. Do you have a few minutes on a work break during which you can

review some of your math? Can you read and study while you eat? If you look carefully, you might find some "hidden pockets" of time that you can use to sneak in some extra studying.



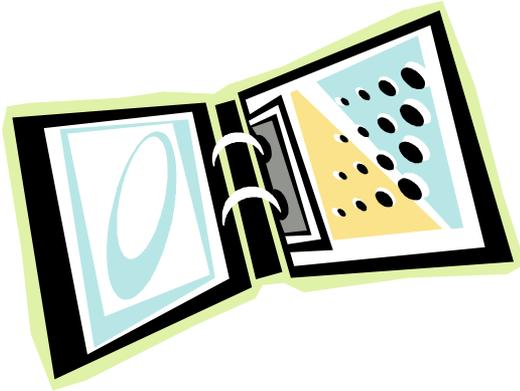
Students' comments about study time

I would study early in the morning, when my mind was "fresh."

The one strategy that has helped me the most is studying right after every class session.

Go over the subject as soon as you get home.

Day/Time	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
7:30-8:00							
8:00-8:30							
8:30-9:00							
9:00-9:30							
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11:00-11:30							
11:30-12:00							
12:00-12:30							



### Students' advice for being successful

I found that doing the homework day-by-day (a little every night) really helped me. Make sure you do all the homework. The flash cards were helpful.

Going over and over homework as well as notes. With no homework a student won't survive. Keep up. If falling behind, get help.

Don't miss any classes. Attendance is critical. I struggled the week or two that I missed a class.

### 3. Read Prior to Class

Understanding the vocabulary and symbols used in mathematics is a big part of learning to do mathematics. Before class (perhaps the day before), read the parts of the textbook that will be discussed in class. Pay special attention to new vocabulary terms and symbols. Highlight or take notes on these. Also look carefully at items that are in boxes or in bold type. Read over the examples too.

$$\begin{array}{r} 510784.36 \\ 2.719372 \end{array} \div 1$$

The purpose of doing this is to get a head start on learning this new material. By studying the vocabulary beforehand, you may better understand what your instructor is saying in class. The words and symbols will not be completely foreign to you, so you will be able to concentrate more on the concepts and skills.

At times, your instructor may tell you NOT to read some portion of the textbook. The reason for this is that he or she probably thinks the textbook will hinder and not help your understanding of the material. In these cases, follow your instructor's directions.

### A note about mathematics vocabulary

Some words used in mathematics are not used outside of the subject. But many mathematical terms are used elsewhere in everyday language. Distinguishing different meanings of a word—and its special meaning in mathematics—is an important part of learning to do mathematics.

Examples:

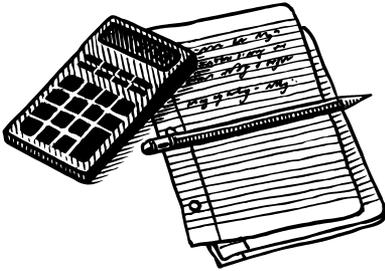
“Power” refers to an exponent in mathematics, but has many other meanings, such as in electrical power, in other settings.

“Difference” is a mathematical term that indicates the result of the operation of subtraction. In everyday usage, “difference” refers to how two or more things are not alike.



## 4. Do Textbook Examples

Each example in the textbook is usually accompanied by a step-by-step procedure for completing it. This is a good source of feedback for you. When you begin your studying, you should re-read the sections of the



textbook that were covered in class and work out each example. Cover the solution to the example, then work it out. You can refer to your notes, but do not look at the solution.

Check your solution with the textbook after you think you have completed it correctly. If you do not do it correctly, read the text once more and review your notes to try to understand why you did not get it correct.

There are two ways you can use this strategy:

- 1) Read and do all the examples in the section before doing the homework exercises at the end of the section or
- 2) Read and do the examples on one concept, then do some of the homework exercises on that concept, and go back and forth between reading/doing examples in the homework exercises.

As in the previous study strategy, your instructor may ask that you NOT use your textbook as a study aid. In these cases, you will need to rely on your notes as you do the homework exercises.



Be sure, in any case, that you are taking **thorough notes** in class.

### A note about doing homework

Do not just do the exercises at the beginning of the problem set. Usually, the exercises get harder as you move on. It is best to do some of each—from simpler to harder—at first, then go back and do the ones you skipped. Make notes to yourself as you do your homework, especially on concepts that are not completely clear to you. You can ask about these problems during your next class meeting.

## 5. Write the Mathematical Procedures

When doing your homework (including the examples), use your notes as a guide and write the procedures you use in completing an exercise. Often, there are different procedures used in problems involving the same concept, such as solving an equation. The more you write what you are doing, the better you will remember it. Once you are comfortable doing a procedure, it is not necessary to write it each time you do it.

Pay special attention to the directions for completing the exercises. You will need to know what the directions mean for you to do and what procedures are used to carry out the directions. The directions often use the specialized vocabulary of mathematics, so it is important to recognize the **key terms** (such as “simplify” or “solve”). Also, the directions to exercises may ask you to do something that is different than



what you would expect to do. (For example, an equation may be given and you may be asked to tell what type of equation it is, not to solve it.)

### Example of writing mathematical procedures

Simplify the following expression:

$25 + 20 \div (-4)(3)^2$  Step 1: Follow order of operations;  
No parenthesis to simplify;  
Do exponent.

$= 25 + \underline{20 \div (-4)} (9)$  Step 2: Look for multiplication or  
division from left to right.  
There's a division first.  
Watch sign.

$= 25 + \underline{(-5)(9)}$  Step 3: Look for more multiplication  
or division. Do multiplication.

$= 25 + (-45)$  Step 4: One operation left;  
Adding positive and negative  
numbers; subtract absolute  
values; use sign of number  
with larger absolute value.

$= -20$

Think :  $45 - 25 = 20$



## 6. Revisit Previously Studied Concepts

Math concepts and skills are cumulative, but often a particular skill is used in a different way later in a chapter. By "recycling" back to material covered previously, you will refresh yourself on these skills. Also, by going back, you will have a chance to review vocabulary, symbols, and directions to exercises that may not be used in later sections.

You should do a variety of exercises when you do this. Do not just do exercises from one section.

## 7. Summarize Concepts and Procedures

After you have completed your homework, take a few minutes to summarize the concepts and procedures you have been studying and practicing. By writing the concepts and procedures in your own words, with your own understanding of them, you are helping to solidify your learning.



A good practice is to write the procedures, as well as vocabulary and symbols you have been using, on individual **index cards**. Doing this will give you a portable summary of all you have learned. You can take this with you and study from your cards in those "hidden pockets" of time you might find.

## 8. Reread Prior to Quiz or Test

As part of your preparation for a quiz or test, re-read the sections that will be covered on it. As you do so, if you are able to follow the explanations and examples clearly, have confidence that you understand the material well. Anything that is unclear should be given extra attention. As you read and do review exercises, be sure you are clear about the directions given for the various types of problems.

Another good preparation strategy is to create (or have someone else create for you) a simulated quiz or test. Make up or choose exercises from the sections that will be covered on the quiz or test and then work these under conditions similar to those under which



you will be doing the actual quiz or test. For example, do the simulation around the same time of day you would be in class and give yourself a time limit, such as 15 minutes for a quiz or one hour for a test.

## 9. Do Quiz and Test Corrections

After a quiz or test is returned to you, do not just file it away. Take some time to review it and **work on the problems that you did incorrectly**. Concepts and skills on a quiz usually re-appear on a test; **items on tests often re-appear on a final exam**. Learn from your mistakes. Most instructors will gladly check your corrections if you ask them to do so.

You can also copy all of the problems on a test onto a clean sheet of paper and then put this paper aside.



As part of your studying for a final exam, rework these tests from the beginning. You can then check yourself with the answers from the original test.

## Other Strategies for Success

A) Find a quiet place to study. If your home is often too noisy, or there are too many distractions, go to the library or some other quiet place to study.

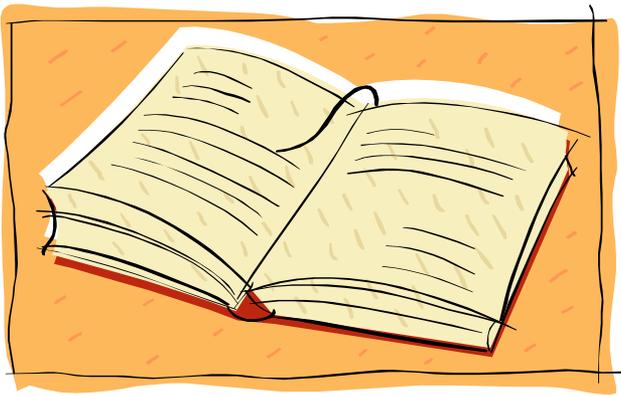


B) Form study groups. For some students, working with classmates is valuable because it allows them the opportunity to discuss the concepts and skills. Talk to others in your class about getting together for study sessions. If it does not benefit you, you can always leave the group or try to find another group with which to work.



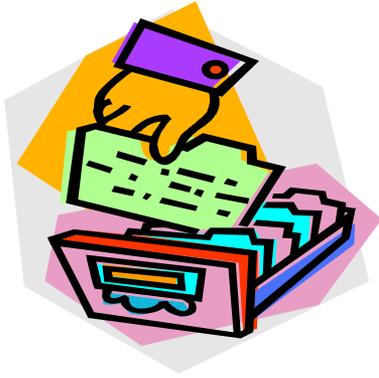
C) Use auxiliary materials. Most textbooks and courses these days have accompanying computer software or videotapes. The Office of Academic Services at NSU has material available for most courses. Some software is available for purchase at bookstores as well.

D) Use the student solutions guide. When you run into trouble doing your homework, the solutions guide that is available for most textbooks can provide you the assistance needed to understand what to do. Be careful, however. Do not just study or copy the solutions in the guide. You must do the exercises on your own, sometimes more than once, before you look in the solution guide.



E) Do chapter reviews and tests. Most textbooks, and the accompanying computer software, include reviews and practice tests of the concepts and skills covered in each chapter. Do as many of the review items as time allows. Making and doing your own reviews is also helpful.

- F) Test preparation strategy: After you finish the homework for a section, write two or three of the assigned exercises of average difficulty level from that section on a note card, one exercise per card, with the solution on the back of the card.



Set these cards aside. When studying for a test on this material, shuffle the cards and then do the exercises again on paper in the order in which they come up. Check your solution for each exercise by looking at the back of the card. For exercises you do not complete correctly, put these cards in a separate stack and be sure to review those concepts again. Doing this along with chapter reviews and tests will give you good practice for the test. It will also provide you with plenty of review exercises for the final exam.



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