

Math Strategies & Study Tips

(Adapted from UIC Academic Center for Excellence: 1200 W. Harrison St., Chicago)

(312) 413-0031 <http://www.uic.edu/depts/ace>

MINDSET FOR COLLEGE MATH:

College math courses require understanding concepts, not simply memorizing formulas. **You need to understand the *why* and *how* behind the formulas if you want to do well.** This level of understanding is difficult to achieve and you should expect to be confused at times. Using good strategies and campus resources will help you move beyond confusion to success.

HOW TO STUDY IN A MATH CLASS:

- **Before starting a new course, review the math from your previous course.**
- **Never let yourself fall behind.** If the class seems too easy at first, remember that all math classes start with some review, but at a certain point they move into high gear.
- Think of math as time-consuming rather than difficult. This will give you a sense of control over your performance in the course.
- Take advantage of your textbook. You may choose to read a section either before or after the lecture to help understand the material better, or you may choose to carefully read through the examples. **In any case don't read your math book with the goal of memorizing it;** instead, think of it as a reference book that will help you understand the math concepts that lie behind the problems.
- As you read your text, **do the computations along with the book.**
- **During lecture, write down everything the professor makes a point of emphasizing—especially conceptual points.** Make a point of understanding the *why* of each step in a problem, and not just the *how*. The *why* explains how you would think of doing each step in the first place. If there is anything you don't understand about a problem, write down each step and then review the process used to solve the problem after class.
- **It's fine to memorize math symbols and definitions, but it is critical to *understand* the underlying processes and concepts.** When you look at a process, ask yourself the purpose for each step. Think of analogies or try explaining a concept to a friend or family member.
- **Still confused? Try some of the following:** a review book, a tutor, or the instructor. **All of the above can be extremely helpful** especially if you use them early in the term. Free tutoring is available from 7:00 to 9:00 every Monday and Wednesday evening. Ask your professor for the room.

HOMEWORK:

- **Do your math homework as soon after class as possible** while the concepts are still fresh. Never wait to do your homework, promising yourself you will catch up on the weekend. The weekend might be a great time to write an essay, but during the week keep up with your math. The most common lament that professors hear after a disappointing test is, "I wish I had kept up with the homework."
- **Begin by reviewing your lecture notes.** Take a separate sheet of paper and try to work the example problems on your own. Check your answers with the ones in your notes.
- **Try sitting down with a classmate to do your homework, possibly in the Math Suite.** Work on your own and consult each other only as needed. If you can't get together in person with a classmate, at least share phone numbers so you will have someone to contact if you get confused while doing your homework.
- **Check your first answers in a given section** before doing a whole set of problems. When you make a mistake, determine the source of the error, and make a mental note of a method for avoiding that kind of error in the future. If you're stuck, consult with another student, a tutor, or your professor.
- When working on homework, try to do *all* of the assigned problems. If you still feel like you do not properly understand the material, then do some extra problems on your own, preferably from the end of the homework section where the richer problems tend to be.
- Although your professor may not require you to always simplify your answers, you should do so when doing homework—the extra practice and sharpening of your algebraic skills will pay off in the long run.
- **Read each problem slowly and carefully**, running a pencil under the words to make sure you notice and understand each word. (Example: By how much did her speed *exceed* his?)
- **Summarize word problems** by drawing a diagram or setting up the information in a table. Sort out the problem into *given, find, need*.
- For a very difficult word problem or when you forget a formula, **substitute simpler numbers**. Once you understand the nature of the problem, use the same process with the actual numbers.
- At the end of a homework session, mentally **review** the most important concepts.

STUDYING FOR MATH TESTS:

- **If the first test seemed to be easy, don't get over confident.** Oftentimes the depth of the material increases a great deal after the first test.
- Remember that doing well on homework and/or quizzes is no guarantee of doing well on an exam. Tests can be more challenging than a sequence of quizzes a number of reasons: a test is usually harder to finish in time and the problems are presented in a random order. Also, the instructor may regard the test as an opportunity to see how well you can apply the material in a new way.
- **Write up a summary sheet of key formulas and definitions.**
- **Attend any review sessions** and take plenty of notes.
- **Review all of your quizzes and rework the problems.**
- **Study for your math test by working mixed sets of problems.** Use chapter reviews, old tests the professor has made available, and/or review books. It's not enough to be *familiar* with the material; you

should have worked so many problems that the routine, computational material is now easy for you. That will leave you more time to work on the conceptual, tougher problems during the test.

- **Do some timed practice tests** or sets of problems. Try to find some application problems with difficult or confusing wording (you will need practice in deciphering this kind of problem). In other words, mimic the testing situation as closely as you can while you work on practice exams.
- After doing several *full* practice tests, you might want to expose yourself to the greatest possible variety of problems by **doing only the first step of additional problems**.
- **During your practice tests, check all results**, just as you will during the test. Use some of the following methods when appropriate: Plug your answer back into the problem to make sure it works. Estimate the answer to make sure you are in the right ball park. Double check units and positive and negative signs. If time allows, rework some of the problems using an alternative method.

TAKING MATH TESTS:

- **Get plenty of sleep the night before the test.** Sleep is essential for higher order thinking.
- When you first get the test, write down any formulas you might forget. Next, look at the number of points given for each problem and think about how to get the most points in the quickest amount of time. If you commonly have trouble finishing a test on time, then apportion your time and **begin work on the easiest problems**. If you get stuck on a problem, move on to the next one and comeback later.
- Expect a few extremely difficult problems and don't let them throw you off balance. Return to them at the end of the test, by which time you may have gained new insights. Clearly write out each step so even if miss the answer you may earn partial credit.
- **AFTER THE TEST:** When your test is returned, **rework any problems you missed** and find out what went wrong. (This is analogous to a sports team preparing for an upcoming game by watching the tape of an earlier game.)