**Guide for Studying Math**

**Math requires active learning.**

Unlike some academic subjects, you can't excel or even become proficient at math by just listening and reading. Math requires actively doing. Consequently, to learn math you must do all your homework and assignments. If you don't do your homework or complete your assignments you won't memorize the formulas or internalize the procedures required to become really proficient in math.  
  
Some people think they're just not good at math. Our experience indicates that most people can do math, however, most people really need to work in order to become proficient at math. While studying a couple hours for a history exam at the end of the term is usually sufficient, math requires routine studying and daily learning. Anyone who isn't willing to get actively involved in the process of learning math, is going to struggle.

**Math is cumulative.**

Math is a very sequential subject. What you learn one day builds on what you learned previously and is required to support future learning. It's like building blocks. If you miss any of the building blocks you can't progress. This is why with math it's so easy for students to fall behind if they miss school or don't complete homework on time. While cramming can help you pass tests in other academic subjects, it will do very little to help you pass your math tests.  
  
As you progress through school, you'll also find that one math class builds upon another. For example, without successfully completing high school algebra it may be very difficult to understand college algebra. You can't perform poorly one year and expect to excel the next. You'll have to go back and re-learn previous math concepts and subjects you neglected to learn in previous years.

**Focus on the principles.**

In most secondary and lower-level college history classes being able to memorize names, dates and events is all you need to pass. However, with math you'll find that rote memorization of formulas and equations won't cut it. Yes, you do need to be able to memorize information, but that's just the beginning. More importantly you need to know how to use formulas, understand how equations work and apply mathematical processes.  
  
Math involves so many formulas, equations and procedures that it can be difficult to remember everything. Don't try and memorize everything. With math, understanding is more important than knowledge. When you start taking advanced mathematics classes in college, some professors may allow you to take a list of formulas with you to your tests. Others may even provide open book tests. All the knowledge in the world won't help you if you don't understand mathematical principles. Focus on developing a good understanding of all the major concepts initially.  
  
Many procedures used for solving one mathematical problem can be used to solve other math problems. As you progress in your math, try and apply what you've learned previously to each new math problem you encounter.

**Learn the vocabulary.**

Math has a vocabulary all of its own. Additionally, many commonly used words have different meaning when used in association with math. Take the time to create a math vocabulary log where you note down and define each new math vocabulary term you encounter.  
  
Many students quickly come to the conclusion that they just aren't cut out for math or that they just can't understand it. This is very rarely the case. Math requires patience, discipline, and dedication. If you dedicate yourself, believe in yourself, and put in the effort you will make it through math – and you might even find that you really like it.

**Math grows in complexity and difficulty.**

Math becomes increasingly complex over time. Consequently, many students have to spend more time studying math than they do other subjects in order to succeed. It's not uncommon to spend several hours a night studying math once you get into college algebra, trigonometry, and calculus. So if studying math is consuming all your time, you're not alone.

**Note taking.**

Students often write down what they see the professor or instructor write down. Unfortunately, most professors and instructors neglect to write down every important concept they discuss. Unless otherwise instructed, you should focus your note taking around key concepts and formulas that are discussed during class.  
  
Include in your note taking any explanatory remarks made by the instructor. These are often never written down by the instructor yet are key to fully understanding the math principle or concept being discussed.  
  
Take copious notes on formulas or concepts the instructor emphasizes, as these are likely to show up on future quizzes and tests. And again, if the instructor says something you don't understand, raise your hand and ask for clarification. We also recommend making a list within your notes of those concepts that you're struggling with so you can go back later and get additional help.  
  
Immediately after class, review your notes. Take a moment to make sure you understand everything you wrote down while the lecture is still fresh in your mind.

**Homework is key to learning.**

Math is one subject that usually requires homework. Math homework is not intended to make life miserable. It's simply necessary if you want to develop good reasoning and problem solving skills.  
  
Most people do not understand math instantly after hearing an instructor's lecture. To learn math you must experience it. You must work out mathematical problems and apply what you've learned. Homework provides students the opportunity to really learn how math works by in theory and in practice.  
  
Homework is most effective when it's completed while the lecture is still fresh in your mind. While there's nothing wrong with waiting to complete your homework until later in the evening, sometimes completely math assignments in between classes, during lunch or right after school while the concepts are still fresh in your mind is most effective.  
  
One of the biggest problems students have when completing math homework is that they don't read the notes and/or text associated with the assignment or individual problems. Many students will quickly attempt to solve a math problem and then give up when they can't see how to do it. Reading all the instructions and notes prior to each homework assignment is necessary to completely math homework problems.  
  
When it comes to math homework, the answer isn't always what the instructors is most interested in seeing. Most math instructors are more interested in how you arrive at your answer than the answer itself. When completing math homework, always show your work. Present the steps you took to arrive at your answer in an organized, logical manner. Many math instructors will give partial credit for answers as long as you show your work. Alternatively, some math instructors will not give any credit for a write answer, if work is not included.

**How to ace problem solving.**

The following are tips for how to go about solving math problems.

* **Read the problem.** Read the problem carefully and make sure you understand what is being asked.
* **Re-read the problem.** Now read the problem again and note down what you are given and what you're being asked to find.
* **What is the problem asking for?** Write down in your own words exactly what it is the question is asking you solve or find.
* **Write down what you know.** Now go back through the problem and write out the information, facts and figures provided in a organized format.
* **Draw a diagram.** If applicable, develop a diagram that more fully represents the problem. Drawing a well thoughtout diagram often suggests a solution.
* **Put together a plan.** Identify any formulas that may help you solve the problem. Figure out what you're going to need to work the problem. Often there are intermediate steps/answer that you'll need to complete before arriving your final answer.
* **Find an example problem.** If you're having a difficult time getting your mind around the problem, try finding a similar problem that you do understand, or that has already been worked out. Work the simpler problem and then go back and work the harder, yet similar, problem.
* **Carry out your plan.** Once you have a good grasp on what's being asked and what needs to be accomplished, work your plan. Make sure to show your work, step by step, so your instructor can see your reasoning and logic – and so that you can go back and check your work.
* **Check your answer.** Sometimes your first answer isn't the correct answer. Does the answer you came up with make sense? If you're able to plug your answer back into the original problem do so. This will let you know if your answer is correct.
* **Review the problem.** Once you've settled on an answer, go back and review the problem one last time paying attention to the concepts, formulas and principles that were required to come up with your solution. This will help you internalized what you've learned and prepare you to tackle more challenging math problems.

**Get some help.**

Ask for help if you need it. Use your teacher, other students or a tutor if necessary. Learning math is much easier if you'll take advantage of the knowledge and experience of others.  
  
Do not wait until the last minute to get help. Math is cumulative. So if you miss a concept, you're likely to get behind really quickly.  
  
Don't be scared to ask questions in class. If you don't understand a concept, chances are there are a lot of other students who don't understand the concept either. Don't worry about what other people will think or how you might look. If you don't understand something, raise your hand, ask a question and get clarification. If there isn't enough time during class to get the clarification you need, visit the instructor during office hours or after class.  
  
Availing yourself of study groups is a very good idea for studying math. With a study group of 4 or more people chances are that at least one person will have a good understanding of a math concept and can explain it to the rest of the group. Having the opportunity to explain complex math concepts to others also helps to solidify your own understanding of the concept. All around, study groups can be very beneficial for studying math.