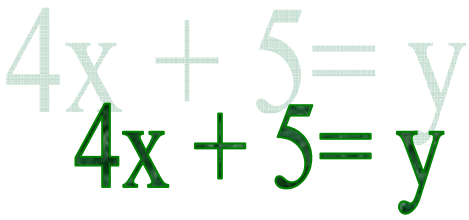

Math Study Skills

General

1. If math is difficult for you, consider the following investments of time and/or money:
   A. Research the best instructor for you before registering. Talk to other students and find out what they liked and why. Remember though, another student's experience may not be like yours, good or bad. Visit prospective instructors during office hours; ask about their teaching methods and if you could visit one of their classes. Select an instructor who explains concepts clearly, welcomes questions, is available outside of class, and gives fair tests.
   B. Audit the course first. Take notes, do the homework, ask questions, study and take the tests. You will just not have the pressure of the grades.
   C. If there is more than one section, ask if you can sit in on another section. Hearing a difficult concept explained a second time may clarify it for you.
   D. Consider stepping back and taking a preparation course, especially if you barely passed the placement exam or it has been quite a few years since you had any math. Math is like a foreign language and if you haven't "spoken" it for 4 or 5 years, it will be hard to plunge into any college course without review.
2. In college math courses, a lot of your learning and practicing will be your responsibility and will happen outside of the classroom. Compared to high school math courses, in college you will have less instructional hours per week and cover twice the ground per course.
3. Don't get a false sense of security by thinking you will get an A or a B just by going to all the classes, completing all your homework, and understanding "most" of it. Tests will measure more than math knowledge; there will be time restraints, no textbook or notes, no helpers available, and often anxiety. You will need to quickly decide appropriate problem solving techniques and already be fluent with your calculator, if they are allowed.
4. It's important to keep up with the class reading and homework. You need to understand earlier material to be able to understand most new material. Do not skip class. Stay focused and take good notes. Overlearn material, at least until you feel more confident and do well on tests. Getting behind can be the easiest way to fail a math course.
5. Make an effort to do ALL homework problems—math is not a spectator sport. You will have to do the problems to be able to understand them. In basketball, you wouldn't improve your free throw by just listening to the coach and watching him demonstrate. You would have to practice—sometimes a lot!
6. Always remember the "say and do" principle. Research shows that we remember only 10% of what we read, 20% of what we see, but a full 90% of what we say and do. So practice, practice, practice. Do assigned problems, make up your own problems, work with a classmate and explain aloud what you are learning and how to solve problems. By becoming more actively involved in the learning process, you will improve your recall process.
7. Do your homework the same day it is assigned. This will help reinforce what you just learned. Estimate the right answers before you work them out. Substitute your answers back into the problem to verify them.

8. Ask questions. Always remember you have the right to ask questions before, during and after class. You may feel less awkward to ask questions during an instructor's office hours. Remember that there are no stupid questions and others in the class may be just as puzzled as you are. Don't leave them unanswered; get help fast.
9. Know and understand your math terminology. Use 3" by 5" review cards to study math's unique vocabulary. Put terms on one side and definitions on the other. Use them at odd moments throughout the day to review and test yourself.
10. Don't attempt to memorize formulas (or rules, proofs, or procedures) without understanding them first. You can use problems from the book for illustration but those same problems will probably not be on the test. You will need to understand the formula to apply to a new problem. You may want to put formulas with definitions and examples on note cards also.
11. The rule of thumb is to spend 2-3 hours per week studying for each credit hour of your class. If your math class is 4 credit hours that means you should be spending 8-12 hours per week studying. Successful students usually spend AT LEAST that much time between the reading and homework. If math is difficult for you, try to plan your course load for the term accordingly.
12. If math is your most difficult subject, make sure to study it first. Don't leave it till the last and be sure to study it when you are most alert. Try to do some math every day. Take 5-10 minute study breaks every 40-50 minutes.

Previewing

1. Make it a practice to read over the topic or chapter before going to class. You will have a better understanding of the discussion and you will learn more from the lecture.
2. Get an overview of the material by reading the introduction and summary, section headings, subheadings, and diagrams.
3. Look at the problems at the end of the chapter. Make note of new terms and formulas.
4. Review previous class notes for old terms and definitions.
5. Formulate possible questions for class
6. The purpose of previewing is not to have a thorough understanding of the material but to get a general idea of what the lecture will cover. This should **not** take a lot of time.

Notetaking

1. When taking notes in class, listen **actively**; intend to learn from the lecture.
2. Date each day's notes. Write the topic or chapter heading on top of the page. Leave a 2" margin on the left side for comments or target words to help you study. Use only one side of the page, leaving the back for additional examples, notes and clarifications.
3. Write down the instructors' explanation about the problem.
   - Copy all the steps—a week from now you may not remember as well.
   - Note any particular conditions of the problem.
   - Note why this approach to the problem is taken.
4. Try to anticipate the consequences of a theorem or the next step in a problem. During a proof, keep the conclusion in mind.
5. Note any concepts, rules, techniques, or problems that the instructor emphasizes (e.g., by writing on board, summarizing, repeating, enumerating, and pointing out difficult or tricky parts).
6. Learn to abbreviate with standard abbreviations or make up your own.
7. Question your instructor during class about any unclear concept or procedure.
8. If you miss something or don't understand everything being presented, then write down what you can catch—especially key words. Put a question mark by steps you don't understand. Be sure to skip several lines so you can fill in missing material later.

9. If things move too fast, ask if you can use a tape recorder. Use one with a counter so you can note down tape locations of questions in your notes.
10. As soon as possible after class, summarize, review and edit your notes.
    - Quickly read through your notes to get an overview of the material and check for errors or omissions.
    - Fill in information that you did not have time for in class or the instructor didn't provide.
    - Use the margin or the back of the opposite page to summarize material, list key terms or formulas, and rework examples. You can also add notes from the textbook here.
    - Go over steps you did not understand with your instructor, tutor or another student.
11. Review your edited notes at regular intervals with the intent to learn and retain. Plan weekly and monthly reviews. Test yourself on the material independently and with others.

Problem Solving

1. Review the textbook material and lecture notes that relate to the homework.
2. Read through the problem at a moderate speed to get an overview of the problem.
3. Read through the whole problem again to find out what the problem is looking for (the unknown). Try to state this in your own words. If appropriate, draw a diagram and label the givens.
4. Decide on a tentative plan to solve the problem by using one of these tactics:
    - Form relationships among all facts given.
    - Think of possible formulas or definitions that might be relevant. Write an equation that includes your unknown.
    - Work backwards; ask yourself, "What do I need to know to get an answer?"
    - Relate the problem to a similar problem from your textbook or notes.
    - Solve a simpler problem using extremely large or small numbers; then follow your example as if it's from the text.
    - Break the problem into simpler problems. Work part of the problem and see if it relates to the whole.
    - Guess or estimate an answer, then try to check it to see if it's correct. The method you use to check may suggest a possible plan.
    - Math is not all logic. Figuring out how to begin a problem may be based more on intuition, past experience, or trial and error.
    - If you are making no progress, go to another problem or take a break and come back later.
5. Check your answer. Check to see if it's in the proper form. Insert your answer back into the problem. Make sure your answer is reasonable.
6. During problem solving, it's often helpful to verbalize what you are thinking. Sometimes that will trigger a solution.
7. Do your work as neatly as possible. It will be easier for you to study from, figure out errors, or to get help from someone else.
8. Do not just memorize problems. Understand the reasons for each step and check your answers. You may see very similar problems on a test or ones looking at different variables in the same problem. Instructors want to test your understanding of the concepts and your application skills.
9. Make up note cards with particularly difficult problems and concepts. They are excellent small, portable quick review tools.

Getting Help

1. Work through material on your own as far as you can. Before you ask for help:
    - Use question marks to identify confusing material in your notes or homework.

- Write down specific questions to ask.
- Remember you will learn more by saying and doing.

2. Find out how to access help from your instructor (office hours, online, etc.) and don't be afraid to ask questions. Your instructor wants you to succeed! Be sure to ask for help right away so you don't get behind. Let your instructor know your math background and ask if they have suggestions to help you succeed.
3. Get contact information from 1 or 2 others in class who would be willing to be "on call" for help or work together on a regular basis. You can help fill in questions from lectures, explain problems to each other, or work through difficult problems together.
4. Getting help from a tutor is comfortable and non-threatening to many students. The Learning Center has drop-in and appointment tutoring available for math. The tutors will expect you to:
   - Work through as much work as possible on your own.
   - Come in with specific questions.
   - Notify them if you have a particular math difficulty or learning style they should know about.
   - Focus on concepts that you don't understand, not just how to do the problem.
   - Explain and demonstrate what you are learning.
   - Not expect miracles—don't wait until you are failing a course to get help.
5. Gather other resources that may be helpful:
   - Review materials for previous math (e.g., summary reference books, and software).
   - Other textbooks that may give you alternate explanations.
   - Practice tests from books or possibly your instructor.
   - Other study aids (e.g., manipulatives, posters, study skill tips)

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Remember passing math is your goal, no matter how much you might "hate" math. Don't dwell on it. Try to develop better study habits and support. Act as if you have control over your success in math. Act as if you are really enjoying it! Often that pretending leads to confidence and success.