

Effective Strategies for Studying Math



The study skills needed to succeed in math are unique. Math requires patience, discipline, and dedication.

1. **Math requires active learning** – Math requires actively doing all homework and assignments. While some people think they're just not good at math, most people can do math but must work to become proficient at math. It requires routine studying and daily learning.
2. **Math is cumulative** – Math learning is like building blocks. What is learned one day builds on what was learned previously and is required to support future learning. 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.
3. **Focus on the principles** – 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.
4. **Learn the vocabulary** – Math has a vocabulary all of its own. Additionally, many commonly used words have different meanings 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.
5. **Math grows in complexity and difficulty** – It's not uncommon to spend several hours a day studying math. In this regard, students are not alone.
6. **Note-taking** – Unless otherwise instructed, focus note-taking on key concepts and formulas that are discussed during class, in addition to any explanatory remarks made by the instructor. Take copious notes on formulas or concepts the instructor emphasizes, as these are likely to show up on future quizzes and tests. Ask for clarification during and after class. Make a list within the notes of those concepts that you're struggling with to 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.

7. Homework is key to learning – Most people do not understand math instantly after hearing an instructor's lecture. Math learning requires theory and practice. **Homework is most effective when it's completed while the lecture is still fresh in the mind.** 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 and therefore give up quickly. Reading all the instructions and notes before each homework assignment is necessary to complete math homework problems. When completing math homework, always show your work.

8. 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 is the question is asking you to solve or find.
- **Write down what you know** - Now go back through the problem and write out the information, facts, and figures provided in an organized format.
- **Draw a diagram** - If applicable, develop a diagram that more fully represents the problem. Drawing a well-thought-out 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 on the problem. Often there are intermediate steps/answers that you'll need to complete before arriving at 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 out the 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 internalize what you've learned and prepare you to tackle more challenging math problems.

9. Get help – Do not wait until the last minute to get help if you need it. Math is cumulative. If there isn't enough time during class to get the clarification you need, visit the instructor during office hours or after class. Go to tutoring.

General Strategies for Solving Math Word Problems

Employing the **SQRQCQ Method** can make solving math word problems easier and less intimidating. SQRQCQ is an abbreviation for:

- 1) **S**urvey
- 2) **Q**uestion
- 3) **R**ead
- 4) **Q**uestion
- 5) **C**ompute
- 6) **Q**uestion.

Step 1: SURVEY the Math Problem – The first step is to read the problem in its entirety to understand what is being asked to solve. After reading it, decide the most relevant aspects of the problem that need to be solved and what aspects are not relevant to solving the problem.

Step 2: QUESTION – Once you have an idea of what you're attempting to solve, determine what formulas, steps, or equations should be utilized to find the correct answer. Basically, what are the questions being asked by the problem?

S	 SURVEY: Read the problem quickly for a general understanding. ☐
Q	 Question: Figure out what the problem is asking. ☐
R	 Reread: Identify the facts, relevant information, and details. ☐
Q	 Question: What mathematical operations do I need to apply? ☐
C	 Compute: Solve the problem. ☐
Q	 Question: Is the answer correct? Does the answer make sense? ☐

Step 3: REREAD – Now reread the problem and pay close attention to specific details. Determine which aspects of the problem are interrelated. Identify all relevant facts and information needed to solve the problem. As you do, write them down.

Step 4: QUESTION – Once familiar with specific details and how different facts and information within the problem are interrelated, determine what formulas or equations must be used to set up and solve the problem. Be sure to write down what steps or operations will be used for easy reference.

Step 5: COMPUTE – Use the formulas and/or equations identified in the previous step to complete the calculations. As each step is completed, check it off the list.

Step 6: QUESTION – Once the calculations are completed, review the final answer and make sure it is correct and accurate. If it does not appear logical, review the steps taken to find the answer and look for calculation or set-up errors. Recalculate the numbers or make other changes until getting an answer that makes sense.

Math and Quantitative Test Preparation Tips

1. **Repetition is key** – The best way to learn and master math concepts is through practice and repetition.
 - First master the fundamental math concepts and formulas then complete as many practice problems as possible.
 - Do not repeat the same type of practice problem as it will not test understanding and mastery of fundamental concepts presented on an exam. Select practice problems that challenge and force tackling concepts in different ways.
2. **Practice difficult problems** – Practice problems that relate to each concept being tested on and take time to practice hard problems. If possible, review problems from past tests administered by your instructor (if allowable).
3. **Work through problems first before seeking assistance** – This practice is key to developing good math skills and developing a strong understanding of fundamental math concepts. Before seeking assistance, go back to the textbook, class notes, or other reference material and spend five to ten minutes figuring out the problem. This type of *struggle* is good, as the brain gains a greater ability to understand. However, if unable to set a problem up, then consult a tutor or teacher.
4. **Focus on understanding principles** – It's imperative to gain an understanding of the key concepts and principles that underpin each mathematical topic to progress through math since mathematics is cumulative. It is not enough to memorize a mathematical formula. Understanding mathematical principles will improve the ability to learn math and performance on math tests.

Ch 2	Limits: $\sqrt{x} \rightarrow$ conjugate • Factor • trig identities • check b^+ and b^- if asked $\lim x \rightarrow b$	
Limits		$\text{rise} = \frac{\Delta y}{\text{run}} = \frac{f(x_1) - f(x_0)}{x_1 - x_0} \xrightarrow{\Delta x \rightarrow 0} = f'(x_0)$
Squeeze theorem		
Continuity	$\lim_{x \rightarrow \infty} \frac{a_n x^n}{b_m x^m} \begin{cases} m > n : H.A. \rightarrow y = 0 \\ m = n : H.A. \rightarrow y = \frac{a_n}{b_m} \\ m < n : \text{no H.A.} \end{cases}$	$f'(x) = \lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a}$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$
Lim at infin.		
Tg. lines	• Tg. line = $y - y_1 = m(x - x_1)$	• $f'(x)$ DNE if corner jump (vertical tg.)
Velocity, speed	• V average = $\frac{\text{change in position}}{\Delta t} = \frac{s(t_0 + \Delta t) - s(t_0)}{\Delta t}$	• $V \rightarrow f'(t)$
Rate of change	• V instant. = $\lim_{\Delta t \rightarrow 0} \frac{s(t_0 + \Delta t) - s(t_0)}{\Delta t} = \lim_{h \rightarrow 0} \frac{s(t_0 + h) - s(t_0)}{h} = s'(t_0)$	• Accel. $\rightarrow f''(t)$
Definit. Derivative	• Speed = Velocity	• Jerk $\rightarrow f'''(t)$
Veloc., Accel, Jerk		

5. **Mathematics is cumulative, keeping up is critical!** – Cramming for a math test isn't effective. Almost every new mathematics concept is based on an understanding of a more basic mathematics concept. A key to learning math, and performing well on math tests, is staying current on homework and understanding of all concepts throughout the course.
 - Come to each math class having read ahead chapters and concepts that will be covered in class. Familiarity with concepts enhances understanding during and after class.
6. **List important formulas/concepts** – Write down all formulas in a math test on a single sheet and

memorize these formulas. Understand the mathematical principle behind each.

- **Tip:** Write down the formulas to be utilized on a test in the margins or opposite side of the test immediately **after** getting the exam. It is useful to have them written when the test becomes difficult and stress kicks in.

- 7. Use study groups** – Studying for math tests in groups can ensure awareness of all the material to be covered on the test and a way to gain assistance, clarity, and understanding. The combined effort of the group can also allow each group member to more quickly and thoroughly prepare for the math exam.
- 8. Rework homework problems** – Don't just review homework problems, actually rework them. Write down the steps required to complete each problem and then rework the problem without looking at the solution. Use previously completed homework assignments to check answers once completed.
- 9. Practice problems in a variety of ways** – Problems on tests could be presented in a slightly different way or format than presented before. Practice challenging to test knowledge. This will also help with learning how to utilize and apply numerous types of formulas.
- 10. Read instructions carefully** – Since questions may contain more than one part, carefully read instructions in each section.
- 11. Estimate the correct answer** – If possible, estimate the correct answer before working out a problem. If your answer is nothing close to what you expected, double-check your work to ensure your figures are correct and that you employed the right process or formulas.
- 12. Show the work** – Always show the steps taken to arrive at an answer. Writing down the steps enables the student to review the answer for mistakes before turning in the exam and could gain the student partial credit if the final answer ends up being incorrect. Other times, no credit is given for a correct answer if it isn't supported by work.
- 13. Don't ignore confusing problems** – When faced with challenging problems, don't attempt to figure out the entire problem at once. Start by writing down everything you know about the problem including what type of problem it is, the information provided in the question/problem, and the formulas that could apply to solve the problem.
- 14. Review exam answers** – If time permits, review final answers. If time permits, re-solve problems to double-check work on a separate piece of paper. If after re-working problems you get new answers, re-examine the instructions or look for calculation errors.

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<https://www.educationcorner.com/study-skills/>. Accessed 3 July 2024*