

Studying for Math and Physics Classes

While many students think studying begins and ends with reading and rereading their book or their notes, more efficient and effective studying involves a more active approach (Link do Studying 101).

Working through practice problems—ideally, A LOT of them—is the most effective way to learn math and to study for a math or physics exam. Taking the test without any practice problems is like taking the road test for your driver’s license without ever having driven a car. Consider this handout as your driver’s ed class.

It helps to have some strategies as you approach practice problems. Below are some ideas to try.

Remember, no one can learn several weeks’ worth of material in one night! It’s important to space out your practice over time. This will allow you to commit information to your long-term memory and get a better understanding of complex concepts. The suggestions below can be used from when you first start learning a new concept and right up until you take a test!

Use resources—especially worked out examples!

Look at your textbook, notes, online videos, and other resources to understand concepts and learn how to work problems.

Use examples as a guide for how to solve problems involving the concept you’re trying to learn. You can follow the steps to learn the general process. You can also use examples to check your work when you are reviewing concepts before an exam.

Suggestion: Cover up the solutions to examples and try working them out yourself first. Then you can use the solutions to check your work, or peek for a hint if you get stuck.

Be able to explain “Why?”

When solving a problem, being able to explain why you’re doing each step will help you have a deeper understanding of the concepts. Don’t get so caught up in what you’re doing that you skip thinking about why you’re doing it. Thinking this way will help you remember how to get from one step of a problem to the next, rather than just memorizing a pattern.

Suggestion: Explain a difficult concept or problem to a friend or classmate. Make sure they are following each step and tell them to ask you questions!

Suggestion: Outline or diagram the steps to various types of problems that you work through. Include the “why” for each step, in your own words.

Mix it up.

Although your homework assignments often only cover one concept at a time, exams usually cover multiple concepts, in no particular order; thus, you will need to know how to quickly identify types of problems and the methods to solve them. When studying for an exam, mix up the types of problems you're practicing to practice identifying and solving different concepts quickly.

Suggestion: Pretend to be a professor! Create your own practice test (or find a friend and make tests for each other) by choosing problems from a variety of sections. Reorder them, so when you are working through the test you won't know what section it came from.

Suggestion: Make flashcards with problems on the front and solutions on the back. Shuffle them up and quiz yourself! Work through the entire problem or just make sure you can recall the steps.

Combine concepts

In math and physics courses, concepts, and techniques you learn later in the course usually build upon things you learned earlier. Try to do problems that involve multiple concepts that are going to be on the exam.

Suggestion: Look through the problems sections at the end of chapters and try to identify what techniques are required to solve each problem. Work through problems that need more than one.

Suggestion: Ask your professor about connections between concepts and suggestions for problems that involve multiple concepts.

Make sure you can do it on your own.

It's easy to feel like you know how to solve a problem when you are looking at solutions, following an example, or watching someone else do it.

Before your test, you should be able to work on problems without looking at solutions or using any resources you wouldn't have on an exam (e.g., a calculator or formula sheet).

It's also important to practice under time pressure, to get yourself used to solving problems more quickly than you might be used to.

Suggestion: Start by doing problems with resources and no time constraint, then move to no resources and no time constraint, and finally try no resources and a time constraint.

Suggestion: Simulate exam conditions. Sit down in a place similar to the testing environment and take a practice test. Time yourself and only use resources that you will be given on the test. Do

this long enough before the actual test to continue studying if you've determined you aren't quite ready yet!

Additional resources:

- [Ten Rules of Good/Bad Studying \(excerpted from "A Mind for Numbers"\) Link to Ten Rules](#)
- [A Mind for Numbers: How to Excel at Math and Science \(Even If You Flunked Algebra\), Barbara Oakley](#)
- ["Success in Mathematics" \(Link to Success in Mathematics\)](#)