

Introduction to Differential Calculus

Prerequisite material: algebra, geometry, precalculus.

The prerequisite is having available for use the knowledge taught in these prerequisite courses, not just passing grades from them.

Course Objectives: acquire a fundamental working knowledge of the theory and application of one variable differential calculus, including statement of definitions, theorems, computations, and some proofs.

EXPECTATIONS AND ADVICE:

1) LEARN ALL THE BASIC INFORMATION.

This means studying the book and the lectures until you know and understand all the definitions, theorems, formulas and procedures. This involves both memorizing and understanding. Thus you should be able to rattle off from memory the definition of a limit, derivative, continuous function, equation for a tangent line, etc... with perfect accuracy. You should also be able to explain clearly what each of these things means.

2) DEVELOP COMPUTATIONAL POWER.

This means learning to solve specific problems and to make detailed and accurate calculations. This can only be acquired by working large numbers of problems, not just the few that are to be handed in. You should spend as much time as you need to learn to work correctly as many problems in the book as possible. I will frequently choose problems from the book, or similar ones, to put on tests. Study the worked out examples, and get any troublesome points explained well before the test on that topic. I am never available for help on the day of a test.

3) PRACTICE LOGICAL REASONING.

One of the main benefits of a mathematics course is in learning to make logical arguments. (This can actually help you in arguing with a judge, or the IRS, or your boss, for example.) This means knowing why the procedures you have memorized actually work, and it means understanding the ideas of the course well enough to be able to adapt them to solve problems which we may not have explicitly treated in the lectures. It also means being able to make a clear statement and to prove it. Practice by understanding my proofs and the book's, and attempt some "prove" or "show" problems.

I will test you on your understanding of each topic, not just your ability to repeat computations exactly like ones worked on the board. You must be able to state general principles correctly, apply them to old and new situations, and write up your solutions in understandable, correct form, using words in complete sentences. It is important to keep up, and to study for the final, since past experience shows people who did not do well earlier, or who do not restudy for the final, do not do well on the final.

Ask lots of questions. I am glad to review anything at all from a previous course, but I can only do this if you ask me.