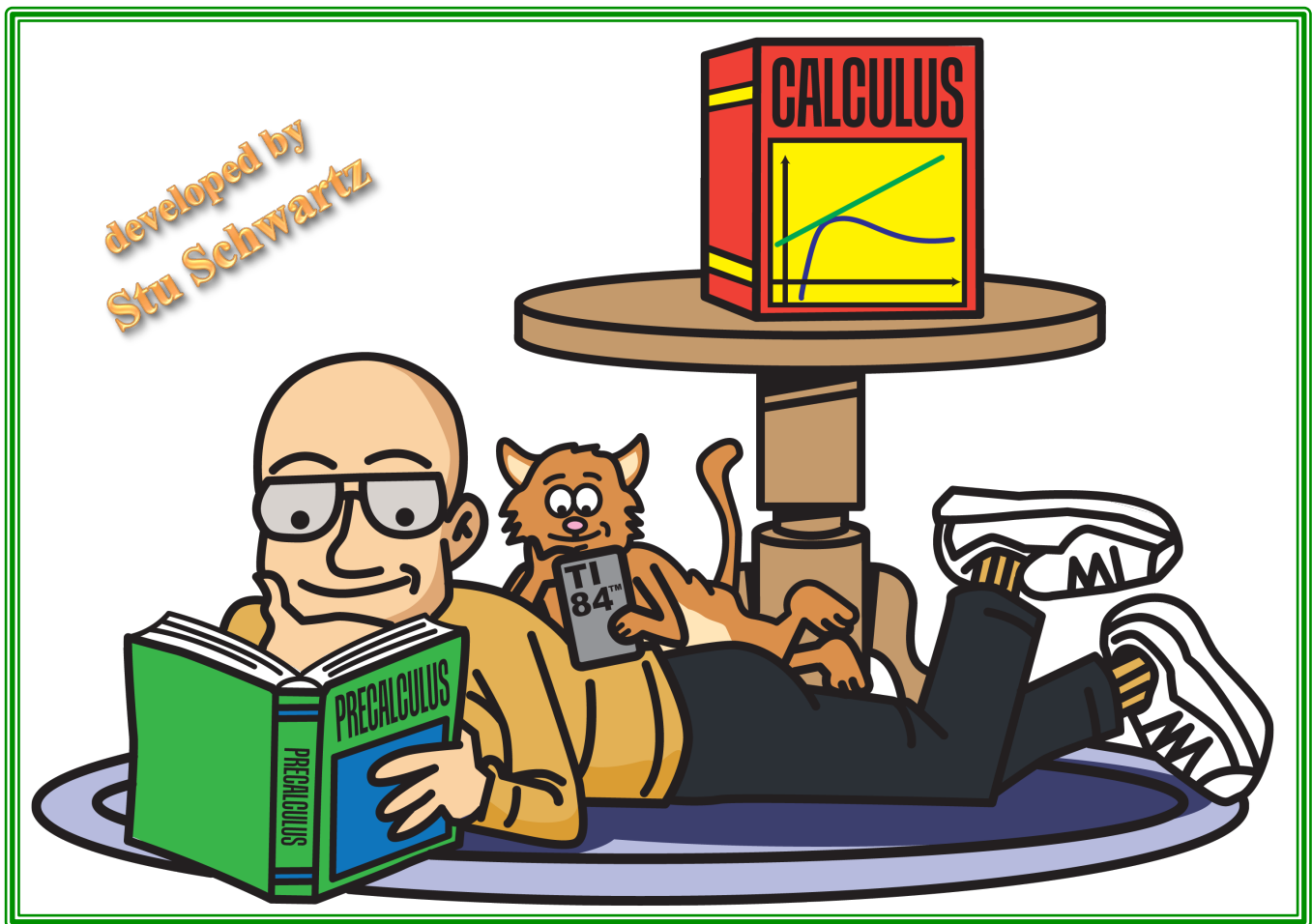


# RU READY FOR SOME CALCULUS?

*A Precalculus Review*



**Student Version**

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Thanks so much to my partner Ted Tyree for his unwavering support and inspiration in all of my projects and his monumental work in bringing my materials free to anyone who wants them through the Internet.

Cover design by Jayson Nocera of Niche Cartoons: <http://www.nichecartoons.com>.

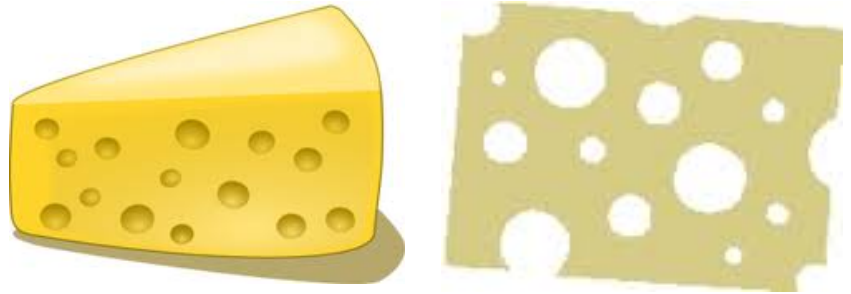
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## To the Student:

Picture a block of Swiss cheese. It is filled with holes and yet it stays in one piece. But this block has to be cut into slices. If there are too many holes, the slice will simply fall apart.



So it is with calculus. The AP Calculus course you are about to take is based on your foundation in mathematics – all the math that you have ever learned will come into play in this course. If you are taking calculus, it is possible that some of that material you knew fairly well at one time, but unfortunately, without everyday use, you just plain forget it. It is also possible that you never really learned it at all.

When you start your AP Calculus course, teachers make the assumption that you have mastered a lot of mathematics and techniques that you need to know are part of you. But it is a bad assumption and worse, a lot of teachers know it. In the past, teachers would start a new year by reviewing and getting everyone's knowledge at the same level. But in calculus, there is simply not enough time to spend time in review.

So teachers teach AP Calculus knowing that there are extreme deficiencies in their student's math skills. And if the deficiencies are serious, the entire year crumbles like a piece of Swiss cheese with too many holes ... holes in mathematical knowledge!

So what is the answer? Review all the math you have ever had? No, that just takes too long and who really cares enough to do that.

So this booklet contains all the material from precalculus that you really need to know going into AP calculus. It does not necessarily review the most difficult concepts of precalculus, but it takes the concepts that were in precalculus and are quite likely to show up in AP Calculus and teaches you, once and for all, to handle problems using those concepts.

For instance, the concept of complex fractions, fractions within fractions, usually only show up in precalculus when you are studying that concept. They rarely show up in word problems or in any other context. So you learn them when you need them, and you forget them 10 minutes after the test.

But in AP calculus, complex fractions occur fairly frequently. Calculus is hard enough and if you lose points on a problem, you want it to be because you had a conceptual issue with the calculus topic, not because your knowledge of precalculus, specifically complex fractions, was faulty.

So this booklet contains just those concepts that are important for you in learning AP calculus. Topics like the conic sections, imaginary numbers, and finding rational zeros of functions, while important in precalculus, are rarely used in AP Calculus so they aren't included in this booklet.

You can be sure that if you review and master all the topics in this booklet, you are well on your way to doing well in AP Calculus. The reason is that many students worldwide struggle in AP calculus because their precalculus abilities are not good. Spending about eight hours on this booklet in total insures that is not going to happen to you!

Let's talk about your calculus course. You are taking an Advanced Placement Calculus course. It is either AB Calculus or BC Calculus. Let's understand what these unusual names mean. The A.P. Calculus program started in the year 1956. There was only one calculus exam given in these early years and it was called "Math." However, once the AP Calculus program got rolling fully, the courses were split into AB and BC and the first year there was a specific AB and BC exam was in the year 1969. There were three general topics into which all math problems fall:

**A Topics:** these are precalculus concepts. They use no calculus but are considered necessary to understand and master before a student can master calculus.

**B Topics:** these are comprised of the calculus concepts taught in a first-year college calculus course.

**C Topics:** these are the calculus concepts taught in a second-year college calculus course.

So in a typical AB Calculus course, students will see problems including A topics and B topics and while in a BC course, students will see problems including B topics and C topics. Before the year 2000, there were problems on the AB exam that were strictly A topics ... no calculus was required. That is no longer true. In reality, all 45 multiple-choice questions and 6 free response questions on the AB exam are B topic questions. They are designed to test calculus.

So, although A topics are not specifically tested, students still need to understand them. You need to be able to solve equations, add algebraic fractions, find logarithms, and find trig functions of special angles. As with spelling, while students are not tested specifically on their spelling abilities by the time they get to high school, it is assumed that they know how to spell.

So, as a review, I have chosen 21 precalculus (A topics) that you really need to know and have mastered before you start your calculus book. This is not meant to be a complete review and if some of these topics are still a mystery to you, ask your teacher for an algebra, trigonometry, or precalculus book to borrow to sharpen your skills. The topics are not the only ones essential to mastering precalculus but were chosen because they crop up continuously in calculus examples. The way you see these examples expressed demonstrate how you will see them in calculus problems.

After every general topic and description, you will see sample problems with solutions worked out. On the back of each page, you will find roughly 12-15 problems that are similar to the examples. Your teachers might assign these over the summer. It is suggested that you do one topic a day. Your teacher might give you a 25-question multiple choice test the first day or so in class or give it to you as a summer take-home type exam. Please take it seriously. Do well in this and you have mastered all the precalculus you need for AP Calculus. You will feel good that your block of Swiss cheese has few holes and when the block is sliced (and you break down calculus concepts), that the piece will stay together.

Best of luck.

Stu Schwartz

