Top Five Ways to Prepare your Kids (and Yourself) for the AP Test

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Which AP Test?

There is a Math based AP course for everyone and giving each of our students a chance to study college level mathematics before leaving High School ensures that they won't be gob smacked when they get to their post-secondary studies by the level of difficulty, by the depth of the material, or by the need to develop consistent habits of preparation.

There are five AP Tests that can be considered Math AP Tests. The **AP Calculus** tests consist of 3 High School semesters, which can add up to 2 college semesters. The "A" semester is about limits and derivatives, the "B" semester is about limits and integrals, and the "C" semester carries "A" into polar, parametric and vector forms and carries the "B" semester into a variety of techniques of integration, including rewriting transcendental functions into Taylor series in order to integrate them more easily. So, the difference between AP Calculus AB and AP Calculus BC is essentially one semester's worth of material. Why it is that students and parents fixate on BC is an interesting question, and certainly an opportunity to consider the ways that we communicate about these two classes.

Since 1996 the College Board has also offered **AP Statistics**, a non-Calculus based course in Stats that is meant to satisfy the course that many non-STEM majors require. The prerequisite for this class is usually Algebra II, and the course is both more verbal and less dependent on symbolic manipulation than Calculus. Students who feel that they "aren't math people" are often surprised by how well they do in AP Stats; conversely, students who believe that they have inherited a "math gene" are often surprised to find that AP Stats challenges them in interesting ways.

In the 80's the College Board started offering **AP Computer Science Programming**, and that course has kept up with the changes in CS (computer science) by changing languages and

problems appropriately. Since 2004 the Language in the CS AP has been Java. But there is more to CS than programming, so in 2017 **AP Computer Science Principles** was developed. This is a project-based course planned to include all aspects of Computer Science, from design theory to ethical considerations, and organized in a way that the CB hoped would attract young women to the discipline.

Setting the goal that every student has access to at least one AP Math course is possible, especially if we note that all but the Calculus courses only require Algebra II as a prerequisite.

When to Start Review & Other Pacing Touchstones

I like to start review as close to April Fools' Day as possible. Aside from the obvious attraction to a high school audience, this gives us a month to get through some organized material. In AB this means that before we leave for winter break, I want to have articulated that an integral is an anti-derivative, and I want to be well into differential equations before Presidents' Day. Areas and Volumes come last, because we play with pipe-cleaners and Play-Doh® to wrap ourselves around the shapes and toys can keep even the most cynical victim of Senioritis engaged. The topic of Differential Equations is a through-line to the whole course. I start asking students to "go backwards" as soon as they begin to learn derivatives with questions like, "If $\frac{dy}{dx} = 2 + x^3$, what could $f(x)$ be?" By the time we get to the Fundamental Theorem it's no surprise to the kids, and by the time we are formally doing Unit 7 they are old hands at antidifferentiation and can concentrate on the more interesting aspects of verbal representations and on Slope fields as geometric solutions.

With BC, it's almost a requirement that some work with limits and even derivatives be done ahead of time in a Pre-Calculus course. I'd go so far as saying that if you can get away with it, BC bound students should enroll in Calculus A as a semester course in the spring before their BC year. (I have actually used this sequence in a few schools, and it works very well.) A BC Pre-Calc also needs to include polar graphs, parametric representations of particle motion, and some work with vectors. I don't care where I am or how anything is going in BC, but we start Series in January. Kids need time to process this topic, and I don't want to be fighting Senioritis when I need the kids focused.

How to Review

There are many released exams and secure exams to choose from. The 2012 is a released, unsecure, exam, so I give that to students shortly before Winter Break. We spend some time in class going through which problems the kids should/could be able to do at that point, and it is a surprising number of the MC and about a third of the parts of the Free Response that are accessible to the kids at the end of Semester I. I tell the kids it won't be due until well after we return in January but that I give it to them before break in case they are motivated to tinker with it over break. Once it is April, and time to review in earnest, I make use of the secure exams on AP Classroom and/or the Audit website. I want the students to have experience in taking the test as close to the conditions as possible, and all of the parts of the test are in 30, 45, or 60-

minute chunks. So, I'll have them do a secure No-calc Multiple choice (60 minutes) in one class and then we'll go over it in the next class. When I have a 45-minute period, the kids do what they can, I don't split the section. When we go over the questions in the following class period, it gives us a chance to review the material that the students need to review, gives me a chance to reinforce the tips and tricks about taking the test, and which questions they ask allows me to organize appropriate homework for later in the week. Because the tests we use are secure, students may not take them from the room, but I keep a folder for each student, and they may look at their work when they are in the room. During the month of April, we manage to get through about 2 full secure exams; I start with the latest one and work backwards. Homework during this time consists of nonsecure, targeted work; sometimes released unsecure exam parts, sometimes other resources I have developed over the years.

Resources for Review- Here are My Absolute GO-TO Resources for AP Calc AB & BC

https://teachingcalculus.com/author/linmc2/

Lin McMullin's webpage, complete with pacing guides, content review, and test taking tips. Seriously, you could skip this article and just go to Lin's web-age.

- https://www.teacherspayteachers.com/Store/Virge-Cornelius-Mathematical-Circuit-Training
  Cheap, wonderful, self-grading, no typos, and vetted by the best; I couldn't teach Calculus (or anything else) without these Circuits. Virge isn't the author of all of these, but her TpT "store" is a clearing house of sorts. She is a QL at the Read and really knows her stuff!

- https://www.facebook.com/groups/757156494357029
  Click on the "Data" tab of the AP Calculus Teachers' Facebook group and you will find more resources than you could ever use; and if you have a question it will literally be answered almost before your hit "enter." The names of great contributors are too numerous to list; it's almost too much information!

- https://apcentral.collegeboard.org/courses/ap-calculus-ab/exam/past-exam-questions?course=ap-calculus-ab
  With the re-vamp of the College Board website and the increased emphasis on AP Classroom as venues to find questions and information, I find the Old Tests are buried deeper and deeper; here is a direct link to the previous FRQ's and their scoring guides.

- https://apclassroom.collegeboard.org/25/home
  AP Classroom had a difficult first year, and it's being constantly updated so it can be frustrating to learn how to use it, but it is worth the effort. There is a tab there for "Professional Learning" that is just about content for teachers, too!

- https://www.youtube.com/watch?v=lC-gwDux9RI&list=PLoGgvigq4844keKrijbR_EPKRNIW6hahV
  The College Board has a You-tube Channel, with 40 – 60 minute review sessions by unit- taught by really great teachers, who are also Readers, Table Leaders, Questions Leaders; an excellent source of info for you and your students!

Test Taking Tips

- Take the test **3** times: First, do the problems you know you know how to do, then do the problems you think you know how to do, then find something interesting and have fun!

- It is difficult to do and feels counterintuitive, but the 90 seconds you take to **look through the entire test before beginning** is not wasted time.

- **SLOW DOWN**. The notion that you want to finish early so you can check your work means that you will rush, avoid writing, and make the careless mistakes that, believe me, you will not uncover when you do the problems a second time. It is much better to focus on accurate and complete solutions the first time through.

- That being said, there are some **time considerations**. MC (multiple choice) questions are designed to average 2 minutes per No Calc question, and 3 minutes per Calc Active question. But those a very rough averages. Free Response questions, however, are written to take about 15 minutes each and are worth 9 points. You want to average about 5 points per FRQ (free response question); and the points are often front-loaded. So, if you find yourself struggling at minute 18 on FRQ # 4 part d), you may be better served to go on to FRQ # 5's a) & b), which will likely yield more points. In terms of enjoyable work with interesting problems, of course we would want to stay with #4, but in terms of earning points on the AP Test, given the time constraint, we may make a different choice.

- **The FRQ problems are in an order**. Number 1 is not supposed to be a heartbreaker, so if you find yourself doing something very involved, you may want to re-think. Number two is the last time we will have a chance to evaluate your skills with a calculator, so you will, at some point, need to use the calculator and this will likely be a difficult problem. Number 6 is usually regarded as the most difficult problem on the test; consider doing is as soon as you can so you are not rushed or exhausted when working on it. Remember you only need to get 5 of the points! This is especially true for the BC test.

- Appoint someone in your group to remind everyone to set the calculator to **RADIAN mode**.

- It is absolutely true to remember that the best thing you can do to prepare for a big exam is to **sleep the night before and to have some protein with breakfast on the day of**!

- If you are going to be taking the test electronically, practice often and well ahead of time; there are numerous tips and opportunities to practice available via AP Classroom: start here: https://apcentral.collegeboard.org/about-ap-2021/updates?course=ap-calculus-ab