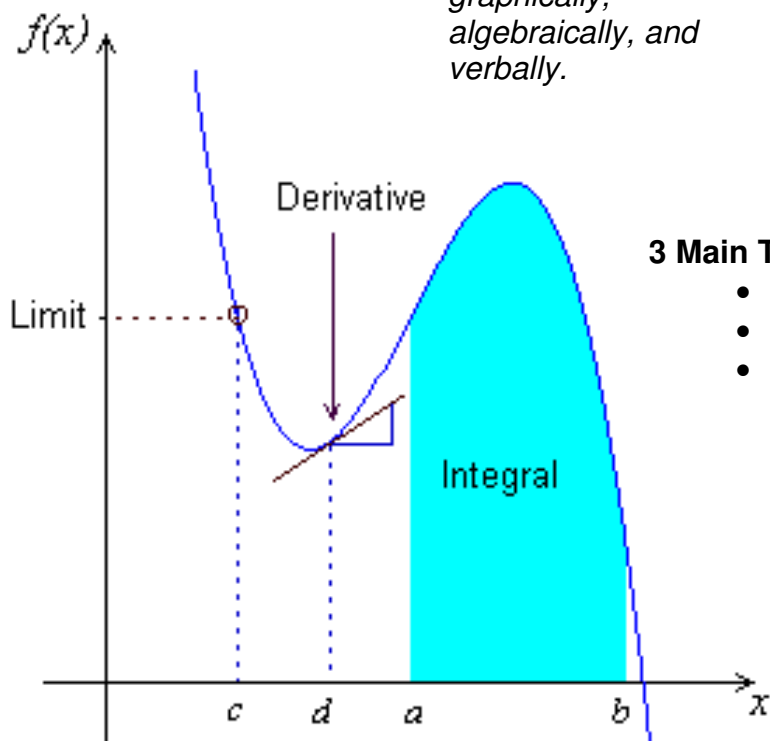


CALCULUS SYLLABUS

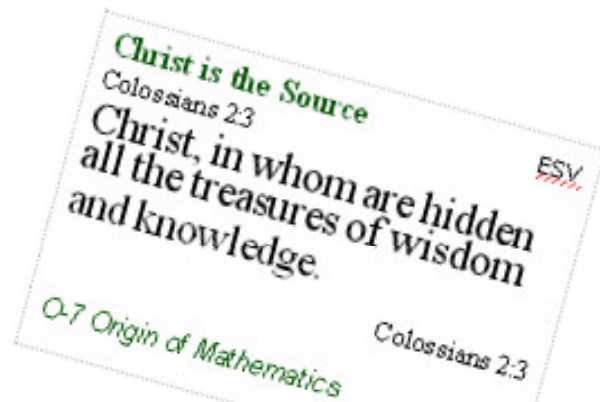
Students will develop their knowledge of calculus in four ways –

numerically
graphically,
algebraically, and
verbally.



3 Main Topics:

- Limit
- Derivative
- Integral



All knowledge, even mathematical knowledge, is the gracious revelation of God. Facts are only interpreted correctly when done so from a Biblical Christian Worldview. Know Christ to know truth.

Believe to understand

Anselm of Canterbury
“Credo ut intelligam”
“For I do not seek to understand that I may believe, but I believe in order to understand.”

Anselm c 1033-1109

Success in calculus is helpful for all sorts of science, engineering, computer, mathematics, and medical careers. Calculus is extremely useful for topics ranging from physics to economics.

HOMEWORK There is homework practically every night in Calculus since mathematics is not a spectator sport. The students have a copy of the homework assignment for every night this semester. See the calculus link at www.cs3.covenantchristian.org/bird or edline.

Homework is due the next day. A reasonable and neat (organized and legible) effort on each problem will be worth 5 out of the 10 points. Correctness for the process will earn the other 5 points. For each day homework from a section in the book is late, it will count off at least 10%. Assignments from the chapter equal about as much as a test. Grades are calculated by total points. Besides hurting your grade, more than 3 NC (not complete) book work will prohibit you from completing the course.

NOTES: Daily notes are available on edline. Students should keep **notes, handouts, homework, explorations, tests, and practice AP exam** questions organized in a **notebook** for efficiency when studying. Notebooks will be graded. Students should come to class prepared and ready to learn with their book, notebook, writing utensil, and TI-89 graphing calculator (I recommend the TI-89 Titanium).

TESTS: Tests will come at the end of the chapter. Look at the assignment schedule to see when they are coming. Generally they will be based on the AP exam. Sadly, this is not the most encouraging exam – getting half of the questions correct is doing respectably well. View tests as a learning opportunity. Correct tests and save them.

GOAL Students will

- learn & enjoy calculus
- do well on the Advanced Placement Calculus Exam on **May 9, 2007**.
- consider the Christian Worldview as it relates to mathematics. They will recognize the wonder and beauty in mathematics and see in this subject a reflection of the character of God.

CODE of Academic Integrity – Academic integrity is expected from each student. Any work submitted by a student in this course for academic credit will be the student's own work. (For this course, collaboration is allowed with your group on exploration and you are also encouraged to help each other out on homework.)

1. A student shall in no way misrepresent his or her work.
2. A student shall refuse to be a party to another student's failure to maintain academic integrity. Students will notify an authority if they become positively aware of cheating.
3. A student shall not in any other manner violate the principle of academic integrity.

Examples of Violations

The following actions are examples of activities that violate the Code of Academic Integrity will result in discipline. This is not a definitive list.

1. Knowingly representing the work of others as one's own.
2. Using, obtaining, or providing unauthorized assistance on examinations, papers, or any other academic work.
3. Fabricating data in support of laboratory or field work.
4. Forging a signature
5. Plagiarism (You must cite your sources.)

You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students.

However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e-mail, an e-mail attachment file, a hard copy, etc.

Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Code can also be extended to include failure of the course and school disciplinary action.

During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and school disciplinary action.

COOPERATIVE ACTIVITIES (seating chart)

The seating chart will help for organized passing in of the homework and group work. Please pass the homework over in an organized and consistent manner. For cooperative activities, groups of two from the front row will turn around to work with the second row. The groups will change about every 9 weeks. When working in groups try to be considerate of the other groups by using your "12-inch voice."

Study groups are encouraged. In fact, if everyone in your assigned study group (which will stay the same for a 9-weeks) scores an equivalent to a 3 or above on the chapter test, each person in that group will get 5 extra points.

Tips for success. (Adopted from <http://www.pen.k12.va.us/Div/Winchester/jhhs/math/lessons/calculus/passcalc.html>)

1. KEEP UP WITH THE ASSIGNMENTS! Over the years, I have found that the best indicator of a student's success is whether they keep up with their assignments. Students who keep up, do well - students who don't, don't.

2. REMEMBER THAT THE GOAL OF AN ASSIGNMENT IS TO UNDERSTAND THE MATERIAL - NOT JUST GET THE PROBLEMS DONE! You understand the material when you can do the problems - and get them right - BY YOURSELF. There is absolutely nothing wrong with asking questions or seeking help from your fellow students or me. Everyone will need help sooner or later in this course. However, you must have the integrity to realize that the goal of the assignment is NOT just to get the assigned problems done! When I select problems for an assignment, I try to pick enough representative problems to provide adequate practice for the "average" student. There will be times when you will need more practice than this, and you must have the courage and integrity to realize it.

3. TREAT ASSIGNMENTS AS "PRACTICE TESTS". Fifty percent of your score on the AP Exam (as well as most tests and quizzes during the year) will be determined from your solutions to free-response questions. For these problems, the correct answer counts for as little as twenty-five percent of the total score. The rest of the points are awarded on the quality of your solution to the problem. This means that if you have correct answers for all problems - with no (or disorganized, or incomplete, or unreadable) supporting work - you will score well. If you have a few incorrect answers, but well-organized, complete solutions that use proper mathematical vocabulary and symbolism - you will generally do well. Use your assignments as an opportunity to practice presenting well-organized mathematical solutions to problems.

4. NEVER ERASE. If you hit a "dead end" and want to start over, cross out the work you don't want with a big "X" - do NOT erase it. It might turn out later to be correct! Erasing can be a big time-waster on tests (where time is very valuable). Material that is "X"d out will not be graded on tests - including the AP test.

5. READ THE BOOK. This is important in every class, but in this class the text serves as a valuable supplement to what happens in class. It is not just a place to find the homework problems. Read the book slowly, line-by-line, with a pencil and paper nearby. Pay particular attention to the illustrations and examples. Study the examples carefully. Work through them with the authors. Be sure that you know how the authors get from one step to the next.

6. LEARN THE VOCABULARY AND SYMBOLS. It is vitally important that we can communicate in the language of mathematics. As you read or participate in class, pay particular attention to the meaning of each new term and symbol.

7. UNDERSTAND THE USAGE OF EACH NEW FORMULA. It is crucial to your success at just about everything that we will do this year! Having a calculator does not mean that you don't need to know any mathematics.

8. VIEW CONSTANTLY. It works out well for you that every test and quiz is cumulative, and we will review extensively in class; therefore review is somewhat automatic. Don't hesitate to go back to review or seek help on algebra, geometry, and trigonometry skills that you may not have mastered sufficiently in earlier courses. The majority of the errors that students make on tests and quizzes are not calculus mistakes - they are algebra, geometry, and trigonometry mistakes.

9. TAKE GOOD NOTES DURING EACH CLASS. Good notes are essential for success in any technical field. They are essential for review - not only for tests, but also for the problems you will work that evening.

10. EVERY MINUTE OF CLASS TIME IS VALUABLE! Use the time at the beginning of class to get ready for calculus - get out your books, assignments, notebooks, pencils, etc.

11. ORGANIZE. Your success depends on your ability to recall (or find, relearn, and then remember) concepts and techniques that were introduced earlier. If your notes and assignments are scattered about, folded inside the covers of your book, papering the bottom of your locker or the floor of your car, you're sunk.

12. BECOME AS SELF-SUFFICIENT AS POSSIBLE. There are many students, and just one teacher, and time is too valuable for you to just wait - stuck in neutral - for help. Look in your text and your notes for sample problems that might shed some light on your difficulty. Learn tenacity - don't just "fold" at the first sign of difficulty! Is there another way to approach the problem? You can do it!

13. WORK TOGETHER AS MUCH AS POSSIBLE. One of the best ways to learn anything is to explain it to someone else. Form a calculus study group. Amaze your friends and family with explanations of how to determine limits or how to compute derivatives.

14. BECOME PROFICIENT AT USING A GRAPHING CALCULATOR. Your calculator is a valuable tool for visualizing and solving problems of all sorts. On parts of the AP exam, as well as on tests and quizzes during the year, you will be required to demonstrate your mastery of the graphing calculator as a mathematical tool. Learn to use it well. Become familiar with ALL of the ways that your calculator can be used to solve a problem, but especially know how to proficiently do the required functionalities of graphing, roots, numerical derivative, and numerical integration. **15. BECOME PROFICIENT AT NOT USING YOUR GRAPHING CALCULATOR.** Be aware that you may not use your calculator for all parts of the AP exam, and that some quizzes and tests will contain "No Calculator" problems. In all cases, you will be required to demonstrate your understanding of calculus. You will be required to provide symbolic (often exact) solutions for many problems, and you must be able to explain your solutions using correct mathematical symbolism and vocabulary.

16. Math is not a spectator sport.

You will need to actively participate – you will need to exercise your brain.

Some of the problems will require some serious thinking.

Take time with them, talk about them, take breaks if you are getting frustrated (but a certain amount of frustration is good), and ask questions if you are stuck, enjoy the process: you are learning!

17. Thinking and understanding concepts will be emphasized here. Many problems that require calculus cannot be solved with the simple application of a formula. Understanding the process for solving a particular type of problem is emphasized over memorizing formulas.

18. Just as you must play a lot of basketball (or video games) to be good at it, you must do a lot of calculus in order to be successful. At minimum, work every problem that your teacher assigns for homework. If you are having trouble or want more practice, work other problems in that section.

19. Work problems more than once. When reviewing or redoing a problem, think about why you take the steps that you do. Remember, the process is more important than the result.

20. The fastest way to get into trouble in calculus is not to do the homework.

You must practice what we have discussed in class. Similar problems will probably show up on tests and quizzes and exams, where you will be expected to work them quickly and accurately. Also remember that you will get more out of your homework time if you minimize distractions (turn off the TV or stereo system).

21. Tests and Exams can be the bane of your existence or they can be showcases of your mastery of the material. When studying for them, work every homework problem assigned in the sections, paying special attention to your methods. Review and work through examples in your notes, again with emphasis on the process being used. When you get back your tests, rework the problems that you missed. **REVIEW SESSIONS** – I will happily have review sessions at school or at someone's house the day or a few days before the test. We could work on review problems and you could ask any questions.

I want everyone to get A's. Top 10 tips for flunking Calc: <http://www.pen.k12.va.us/Div/Winchester/jhs/math/lessons/calculus/top10.html>