

Math 520: Advanced Placement Calculus BC

Course Description

AP Calculus BC is a continuation of the study of calculus, designed to follow the AP Calculus AB course. It is comparable to a second semester calculus course offered in colleges and universities. It is expected that students taking AP Calculus BC will seek college credit, college placement, or both. The material covered in this course is that which is specified in the College Board's Advanced Placement Course Description booklet for Calculus (see "Topical Outline for Calculus BC"). My goal in this course is for you to learn "intermediate" Calculus and to prepare you for the AP exam, which is May 15.

In this course we will continue our study of functions, graphs and limits, derivatives and integrals. We will also work with series and polynomial approximations. We will work with concepts in a variety of ways – graphically, numerically, analytically, and verbally.

Essential Questions

How can rates of change be calculated for more complicated continuous functions? How can we calculate areas under curves determined by more complicated continuous functions? How can infinite series be used to represent functions?

Textbook/Material Covered

Finney, Ross L., Franklin Demana, Bert Waits, and Daniel Kennedy, *Calculus: Graphical, Numerical, Algebraic*, Third Edition, Pearson Prentice Hall, 2007.

The following topics (including their sections and chapters of the textbook) will be covered throughout the course.

Section	Topic
1.4	Parametric Equations
3.6	Slopes of Parameterized Curves
4.5	Newton's Method
6.1	Euler's Method
6.2*	Antidifferentiation by Substitution (trigonometric substitution)
6.3	Antidifferentiation by Parts
6.5	Logistic Growth (including integration with partial fraction)

	decomposition)
7.5	Applications from Science and Statistics
8.1	Sequences
8.2	L'Hopital's Rule
8.3	Relative Rates of Growth
8.4	Improper Integrals
9.1	Power Series
9.2	Taylor Series
9.3	Taylor's Theorem
9.4	Radius of Convergence
9.5	Testing Convergence at Endpoints
10.1	Parametric Functions
10.2	Vectors in the Plane
10.3	Polar Functions
	Additional Topics as Time Allows

*requires further supplementation from other sources

Expectations

What I expect from you

- I expect you to be in your seats and ready to begin class promptly.
- I expect that each day you will come to class with your textbooks, notebook, calculator, a pencil, and your homework. You will need a graphing calculator on a regular basis. If you don't have one then please see me; school has some loaners.
- I expect calculators to be used for problem-solving only. No games during class! Except Tetris. JK: no games.
- I expect you to read the assigned sections of the book (*really*). I will not be able to show all the different types of examples that the textbook presents. Having the ability to read and learn from text on your own is an absolutely essential skill for college and, more important, life beyond school.
- When solving problems, I expect you to write sequential, clear, and complete solutions. Complete, precise, and accurate communication of reasoning and justification of your solutions is required to receive full credit. For writing assignments (including questions requiring written explanations), I also expect correct grammar, spelling and punctuation.

- If you are absent, I expect you to be responsible for finding out what work you need to make up. That work needs to be completed in a timely fashion.
- As stated in the student handbook, I expect cell phones to be turned off and put away.

What you may expect

- **Homework:** You can expect to have homework assigned each day, most frequently consisting of reading in preparation for the next day's class, as well as finishing any unfinished problem sets.
- **In-Class Activities:** Often there will be in-class activities (explorations/group work/practice problems). If you are absent, make sure to check on what in-class work you have missed.
- **Honesty:** This is a serious matter to me. I encourage you to work with classmates on homework and in-class activities (unless told otherwise), but each student is expected to write up his/her own paper. Any incidents of copying or cheating of any kind will be handled in accordance with school policy.

Grading Policy

- **Mini-quizzes, Quizzes and Tests:** We will have quizzes and tests throughout the course. Tests are scheduled in advance, titled "Unit # Assessment" on the web page. You can expect quizzes at any time. Sometimes I'll warn you in advance; other times I won't. As part of preparing for the AP test (and college), I do not believe in giving extra time (except for a few extra minutes at the end of class) for completing tests, unless your documented educational plan allows for extra time. Do not plan on being able to come back at a later time to finish a test.
- **Other information about Assessment:**
 1. We begin the semester with a mock AP Calculus AB exam. You will work in pairs to complete the exam. Communication of concepts and techniques is highly encouraged.
 2. Most semester tests include two parts: one part prohibits the use of a calculator, and the other part requires the use of a calculator. Both parts of the test are mostly "free response" questions, and require complete, precise and accurate communication of solutions in order to receive full credit.
 3. An oral presentation project is assigned after the AP exam. Students may work individually or in groups. The project is presented orally, and written documentation and notes are required as part of the grade. This project counts as a test grade.
- **Grades:** Your *quarterly* average will be computed by averaging your scores in the above areas, and by using the following weighting.

Tests:	80%
Quizzes:	10%
Participation/Investment:	<u>10%</u>
Total	100%

At the end of the course you will have a final assessment of some sort, likely an exam. Your two quarter grades will be averaged together. Your *final course grade* will be calculated by using the following weighting:

Quarter 1:	45%
Quarter 2:	45%
Final Assessment	<u>10%</u>
Total	100%

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Unit 1 – Extensions from Calculus 1 Assignment Sheet

<u>Assignment</u>	<u>Read Section</u>	<u>Page</u>	<u>Problems</u>
1A	1.4	34	1-4 (you don't need to give the window),5,9,13,18,23,37-42
1B	3.6	153	19,21,23,41,43,45,71,73,75
1C	4.5	242	1a,13,15,16,17,45,57,61,63
1D	6.1	327	35-40 (match only),41,44,47,59,61,62,63
Review	1.4 3.6 4.5 6.1	34 153 242 327	14,15,17,24 42,44,46 11,18 43,48

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Unit 2 – Integration Techniques and Applications Assignment Sheet

<u>Assignment</u>	<u>Read Section</u>	<u>Page</u>	<u>Problems</u>
2A	6.2	338	21,29,33,55,57,81
2B	pp. 403-404 Stewart	N/A	Worksheet 2B
2C	pp. 404-405 Stewart	N/A	Worksheet 2C
2D	pp. 405-407 Stewart	408 Stewart	15,16,17,19,21,27
2E	6.3	327	3,5,19,21,23,25,30,35,41
2F	7.4	415 416	6-9 5,11,13,21,27,32-35
2G	pp.384-385 7.5 (work)	425	3,5,9,11,34,36,38
2H	7.5 probabilities	425	27-31
2I	Review	408 Stewart 373 FDWK 430 FDWK	4,10,20,28 19,20,21 27,31,32,33,34,40,42(a only)

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Unit 3 – Sequences, L'Hôpital's Rule, and Improper Integrals Assignment Sheet

<u>Assignment</u>	<u>Read Section</u>	<u>Page</u>	<u>Problems</u>
3A	8.1	441	1,9,13,17,19,21,23,29,33,35,37,43,45-50,54
3B	8.2 through example 7	450	2,7,12,15,17,19,29,60,68
3C	Remainder of 8.2	450	21,23,25,33,43-51 odd, 57
3D	8.3	457	1,5,11,13,19,20,23-26,30,33,35-38,43,44,46-48
3E	8.4 through example 5	467	1,3,5,11,15,17,21,23
3F	Remainder of 8.4	467	25,27,31,37,41,43,48,49,55
3G	Review	470	1,4,5,8,9,13,25,27,37,43,54

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Unit 4 – Infinite Series
 Assignment Sheet

<u>Assignment</u>	<u>Read Section</u>	<u>Page</u>	<u>Problems</u>
4A	9.1, through example 3	481	2,4-6,11-13,16,18,19,50,69-71
4B	Remainder 9.1	481	21,23,27,31,37,41,55,57,64 and Exploration #1 on page 484
4C	9.2	492	1,3,5,11,15a,22,37-40
4D	N/A	492	7,15b,21,23,30,32,33,41,42
4E	9.3	500	5,7,9 (see hint for #8),19,23,27,39-41
4F	9.4, through example 6	510 511	Quick Review 1-5 1-11 odd, 17,21,29,31
4G	Remainder 9.4	511	15,19,23,25,33,39,43,45
4H	9.5, through example 4	522 523	Quick Review 1,3,5 1,5,7,9,13,15,17,21
4I	Remainder 9.5	523	23,24,25,27,37,42,44,68-71
4J	Review	526	Exercises in Red , and #65 Do more problems in areas you need practice

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Unit 5 – Parametric, Vector, and Polar Functions Assignment Sheet

<u>Assignment</u>	<u>Read Section</u>	<u>Page</u>	<u>Problems</u>
5A	10.1, through example 2	535	1,5-11 odd, 17,19,23
5B	Remainder of 10.1	535	25,29,33,43,45-50
5C	10.2, through Properties of Vector Operations	545	1-21 odd
5D	Remainder of 10.2	545	25,27,29,35,37,41,49,61 (calculator ok for 41 and 49)
5E	10.3, through page 551 (also see Polar Gallery, pp. 555-557)	548	1,3,5,9,11,13,23,29,31,35,37
5F	Remainder of 10.3	548	15,17,19,41,45,47,57,61-66
5G	Review	560	You choose from review exercises

Even Answers:

HW 5B (10.1) 46) True 48) C 50) D
HW10F (10.3) 62) False (gives double the area) 64) E 66) D