

Ad Astra Calculus AB & BC
Advanced Placement Summer Institute
July 21-24, 2014

Institute Overview

The AP Calculus AB & BC workshop is designed to help teachers build the foundation for a successful AP Calculus program. Emphasis will be placed on the rigor of the material that students need to be successful on both the AB & BC AP Calculus exams. A significant amount of time will be spent on the content within the calculus courses. Additionally, participants will be involved in activities to enhance the understanding of calculus and to develop deep meaning of the subject. These activities will be provided to participants as items to be used within their own classrooms. We will review the requirements for the course audit and the syllabus requirements. Resources available on the internet will be explored, and participants will spend time examining a variety of technological applications, including graphing calculators, computer algebra systems, and web resources. Discussions will also involve how inquiry-based learning can increase the student performance and interest in the subject, and examine how we can make classrooms involve more inquiry-based instruction. We will also focus on the free-response and multiple-choice portions of the exam and how to best prepare our students for the AP test. Time will be allowed for best practices and for sharing ideas as a group.

What to bring:

- Please bring copies of your best activities, lessons and exams to share.
- Bring a copy of your current textbook.
- Please bring a laptop or tablet and/or a thumb drive for saving and transferring information.

Consultant Background

Janice Rech is an Associate Professor of Mathematics at the University of Nebraska at Omaha and has been conducting AP Calculus workshops for College Board for the past 20 years. She serves as the Dual Enrollment Calculus Coordinator for the University of Nebraska and works regularly with calculus teachers throughout the Omaha metropolitan area. Her Ph.D. is in Mathematics Education, and she has worked with teachers at all levels, from elementary teachers, through college instructors. Dr. Rech has been involved with Nebraska Math, where she teaches a variety of math courses for teachers from across the state of Nebraska. During the past two years, she has received grant funding to introduce inquiry-based learning into the Calculus sequence at the University and results have indicated increased achievement of students with these efforts.

Preliminary Schedule

Monday

- 8:00 – 8:30: Workshop introductions and opening discussion: slope activity
8:30 – 8:45: Philosophy & purpose of AP (p. 2-3 of book)
8:45 – 9:30: equity activity, AP equity & access (beginning of book), recruitment, a look at state participants (report to the nation:
<http://media.collegeboard.com/digitalServices/public/pdf/ap/rtn/AP-Report-2011-NE.pdf>)
9:40 – 10:10: AP course audit, online source & manual, sample syllabi (within course audit section)
10:10 – 10:20: Role of the calculator in AP Calculus Exam format and recent changes
10:20 – 11:00: Algebra and trigonometry prerequisites, (look through texts, present important ideas to class)
11:00 – 11:30: Functions, Limits & Continuity, “**It’s Your Turn**” problems, Functions, Graphs & Limits (discussion: How do we get these ideas from algebra across?), and worksheets **on limits**, continuity
12:30 – 3:00: Worksheets: **Properties of Graphs Activity; Graphical Approach handout, Sign Chart activity, Chain Rule Activity, Graph Behavior Activity, Graphs of Derivatives, Mean Value Theorem**
3:00 – 4:00: Matching games with derivatives, continue with worksheets

Tuesday

- 8:00 – 9:30: Do workbook problems on derivatives on multiple-choice problems & finish any discussion from Monday, regarding continuity, limits, and derivatives (**Released MC by topic**)
9:40 – 10:00: Integral problems – **Early integral stuff, Accumulators – graphical, Accumulators – applications, Accumulating area handout, FTC handout**
10:10 – 11:30 Integral problems & handouts continued
12:30 – 1:30: Special Focus problems: **Fundamental Theorem of Calculus**
1:30 – 2:00: Begin AB problems (**AB: Function analysis, particle motion; AB: Graphical analysis**)
2:10 – 3:00: Sequences, series & polynomial approximations (BC only)
2:10 – 4:00: Continue AB: Function analysis, particle motion; AB: Graphical analysis

Wednesday

- 8:00 – 8:45: Finish AB problems from Tuesday and Tuesday worksheets
8:45 – 9:45: MC & Free response questions from workbook on integration & FTC
9:50 – 11:00: **Online resources:** AP Central (individuals go through resources & prepare to report back to group) (including Wolfram-Alpha)
11:00 – 11:30: Report back to group on activities/resources from AP Central/others
12:30 – 1:30: Differential equations & slope fields; **slope fields handouts, coffee handout**, & matching games
1:30 – 2:30: MC & free response using differential equations & slope fields
1:30 – 2:30: Polar functions & vectors (BC only)
2:40 – 4:00: Finish polar & vector functions (BC only)
2:40 – 4:00: **AB: Area & volume; AB: Diff eq, piecewise & implicit**

Thursday

8:00 – 9:30: Finish AB problems from Wednesday (Area & vol, diff eq, piecewise & implicit) and do **AB: Function analysis rates**

9:30 – 10:30: Finish all 2013 problems from workbook

10:30 – 11:30: Groups do problems from previous tests

12:30 – 1:30: **AB: Table analysis functions; AB: Function analysis equations**

1:30 – 2:00: **Calculator Exercises worksheet**

2:10 – 3:30: Go through all **2014 problems**

3:30 – 4:00: Final thoughts – best advice! **Top 10 Student Errors**

Graduate Credit Option

Participants may also earn three graduate education hours for any of the AP Summer Institutes from Washburn University for a reduced tuition rate the successful completion of an academic assignment.

Additional Information

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