

Welcome to the AP* Calculus AB summer institute! I'm looking forward to sharing some of my ideas and experiences with each of you. I currently teach at West Salem High School in Salem, Oregon. I have been teaching math since 1986 and first started teaching AP* Calculus BC in 1995. In addition to AP* Calculus BC, I've taught AP* Calculus AB and AP* Statistics. I have been a Reader for AP* Calculus since 1999. In 2013 I joined the AP Calculus Test Development Committee. Through my experiences as a Reader, Table Leader and Test Development Committee member I've gained a lot of knowledge, not only about Calculus, but also how to prepare students, and the "flavor" of the problems to expect on the examination.

This summer institute is designed for teachers interested in incorporating graphing calculators and a variety of other activities into an AP* Calculus AB curriculum. We will utilize the graphing calculator to investigate limits, derivatives, integrals, differential equations, and slope fields. Come and experience activities that will help lead your students to grasp the fundamental ideas and applications of calculus. We will frequently employ a multi-representational approach to calculus, with concepts and problems being expressed geometrically, numerically, analytically, and verbally. You'll learn to use your calculator to reinforce the relationships among the multiple representations of functions, to discover new ideas, and to confirm written work.

Throughout the week you'll gain a clear understanding of the goals of AP* Calculus, which will have an impact on how you teach the course. With a clear understanding of these goals, you will be able to better prepare your students for the AP* examination.

Participants will learn about the new AP* Calculus Framework, the new topics on the exam and the new test format. You will experience individual and group activities that will help students discover new ideas or reinforce concepts already learned. There will also be time set aside for each participant to share a favorite activity or lesson. This way, you will have numerous new ideas and techniques to employ into your classroom.

Participants will also experience the grading or reading process for the free response questions. You'll learn how standards are set, explained, and applied to recent AP questions. We will look at the questions from the 2019 exam, and discuss common student mistakes and points that teachers should be emphasizing.

Please bring your graphing calculator.

2019 APSI Calculus AB Tentative Agenda

Monday

- Introductions (background & experience with AP, text book and calculator you use, goals for the week)
- AP Calculus 2017 Redesign (AP Calculus Framework, new topics, Mathematical Practices, new test format)
- Philosophy & Goals for AP Calculus AB
- The Examination and sample questions
- Text book and resources
- **Limits & Continuity**
- Activities: Aquarium Problem, Limit Dominoes
- **Rates of Change**

Tuesday

- **Applications of the Derivative**
- Group Activity—Matching Graphs and its derivatives
- **Implicit Differentiation**
- Demo Calculus In Motion (Define Derivative, Graph f tan der int, Inverse Function Derivative, Related Rates)
- Activities: Search & Rescue, Velocity-Acceleration-Speed, Chain Rule
- Practice: Related Rates and Finding the Derivative of an Inverse Function
- Free Response & Multiple Choice Practice

Wednesday

- **Riemann Sums & Accumulated Rates of Change**
- Activities: Tarsia, Volumes of Solids with Known Cross Sections, Rates In & Out (Bats & Bees)
- **Functions Defined by Integrals & The Fundamental Theorem of Calculus**
- Demo Calculus in Motion (Area Between Two Curves, Define Integration, Riemann, Volumes on Base, Volumes by Revolution)
- Practice: Definite Integral \Leftrightarrow Limit of a Riemann Sum
- **Average Value of a Function**
- Free Response & Multiple Choice Practice

Thursday

- Speeding & Slopes (MVT)
- **Differential Equations & Slope Fields**
- Demo Calculus in Motion (Theorems MVT & IVT & MVT Integral, Slopefield & Euler's Method)
- Practice Scoring 2019 Free Response Student Samples
- Activities: Reasoning from Tabular Data, The Integral Function, Oregon Water Consumption
- Exploring the FTC from Numerical and Graphical Points of View