**AP Institutes**

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AP CALCULUS AND PRE-AP INSTITUTES OFFERED:

AP CALCULUS AB INSTITUTE

The content of Advanced Placement Calculus AB is covered with an emphasis on approaching the material graphically and intuitively with heavy emphasis on conceptual analysis. The AP exam is requiring more mathematical rigor in the justifications on the free response questions and this will be addressed. Hints and practice for the AP test, the use of graphing calculators, and grading free response questions using the grading standard are also included. Internet and computer resources for calculus are included, as well as hands-on activities that increase student comprehension.

PRE-AP MIDDLE SCHOOL MATHEMATICS INSTITUTE

The goal of the course is that teachers work together to experience and share ways to uncover the meaning and use of the concepts and basic skills needed for success in middle school Pre-AP mathematics. A variety of activities, strategies, and methods, including manipulatives, graphing calculators, and other tools, will be used to increase student understanding. Emphasis will be on exploration and problem solving algebraically, numerically, graphically, and verbally, since facility changing a problem's representation is often critical in revealing a method of solution. This course is targeted towards both inexperienced and experienced teachers.

PRE-AP HIGH SCHOOL MATHEMATICS INSTITUTE

Teachers will be encouraged to teach Pre-AP strands that connect from Pre-AP Algebra I to Pre-AP Geometry, Algebra II, Pre-calculus. The main objective is for teachers to gain effective strategies that will prepare students for AP Calculus and AP Statistics. Teachers who want to inject the classroom with energizing and thought-provoking construction of mathematics are encouraged to attend.

Topics will include the following:
* The rule of four, limits, sequences, rate of change, functions, area under a curve, trigonometric tie ins, geometric means, construction, areas of plane figures, areas and volumes of solids, coordinate geometry and transformations
* Algebraic perspectives that are relevant to high school mathematics students
* Using physical manipulatives to introduce mathematical concepts before rigorous application
* "Identify ways for students to "justify the answer," early and often in the curriculum & address the question: "What makes my test Pre-AP?"
* Dynamic mathematics experiences, explorations with TI-Nspire CAS graphing calculators
* Implications of the use of technology in Pre-AP Mathematics classes will be addressed.

AP CALCULUS BC INSTITUTE

This course is designed to meet the needs of AP Calculus BC teachers. Participants will receive materials to use in the classroom including teaching notes, discovery lessons using the graphing calculator, worksheets, and AP practice problems. Discussion of how to fit the AP Calculus BC topics into the school year and how to review for the AP exam will be included as well as a review of new insights gained from the AP reading.

Topics will include arc length, Euler's method, techniques of integration (including integration by parts and by partial fractions), logistic growth, L'Hopital's Rule, improper integrals, parametric equations and vectors, polar equations, series of constants, Taylor polynomials and error bounds for polynomial approximations, and Taylor series.