A-G Calculus

Course Description:
This is an accelerated, in-depth course covering functions, graphs, asymptotes, continuity, limits and derivatives, chain rule, curvature determination, Riemann Sums, antidifferentiation, definite and indefinite integrals, numerical approximations of integrals, the Fundamental Theorem of Calculus, and applications to physical world models.

Prerequisite(s): Above-average skills in Trigonometry/Pre-Calculus. Length of Course: One year required for graduation

Year in School Taken: 12

Course Outline/Details: Limits of Functions:

- Definition and graphical interpretation of limit of values of functions
- Intermediate value theorem and extreme value theorem
- Differentiability

Derivatives:

- Definition and graphical interpretation
- Chain rule
- L'Hopiml's rule, mean value theorem, and Rolle's Theorem
- Newton's method for approximating the zeros of a function
- Sketch functions and identify maxima, minima, and inflection points

Integrals:

- Fundamental Theorem of Calculus and integrals
- Use definite integrals to compute area, volume, velocity, acceleration, curve length
- Approximate integrals numerically using Simpson's Rule and Newton's Method
- Power series and Taylor series expansions

Word Problems:
- Parametric functions
- Problems in physics, chemistry, and economics
- Newton's method applied to maximum-minimum problems

Methods for Evaluating Student Performance:
Evaluation of student performance is based on individual abilities, interests, and talents. Methods by which student progress is assessed will be through a variety and/or combination of methods. The methods available include but are not limited to the following:

Monthly review of work by education specialist (credentialed teacher)

Portfolios
Parent facilitator and education specialist observation
Student demonstrations
Student grades
Student work samples
Research Projects
AP Examination

Texts:

Calculus with Applications, by Urso Glencoe McGraw-Hill, 1995
ISBN: 007066512

Calculus, Premiere Edition, by Smith and Minton Glencoe McGraw-Hill, 2000
ISBN: 0077230474X

Calculus of a Single Variable, Larson/Hostetler/Edwards
Houghton Mifflin6th & 7th Edition, 1998 & 2002 ISBN: 0-39588578-7

Calculus
Saxon Publishers ISBN: 1565771990 Solutions Manual ISBN: 0939798352

NoteThe typical sequence course sequence for Saxon Math is:

Saxon Alg 1 8th grade (or 9th)
Saxon Alg 2 = a-g Alg 2 9th (or 10th)
Saxon Adv Math, year 1 of 2 = a-g Geom 10th (or 11th)
Saxon Adv Math/Calculus year 2 of 2 = a-g Trig/PreCal 11th (or 12th)
Saxon Calculus = a-g Calculus 12th