Course Syllabus

Description:
Comparable to college and university calculus, this course will help prepare you for the Calculus BC Advanced Placement® exam. This course meets one required math credit for high school graduation.

Estimated Completion Time: 2 segments / 32-36 weeks

Major Topics and Concepts:
Starting Segment I:

Module 00 Getting Started

- 00.01 Things to Know
- 00.02 Navigation
- 00.03 Lessons and Assessments
- 00.04 Course Specifics
- 00.05 Online Learning 101
- 00.06 Pace
- 00.07 Academic Integrity

Module 01 Functions

- 01.00 Module One Checklist and Pretest
- 01.01 Course Introduction
- 01.02 Introduction to Calculus
- 01.03 Review of Function Terminology and More
- 01.04 Graphing Calculators
- 01.05 Compositions and Transformations of Functions
- 01.06 Some Common Functions
- 01.07 Discussion-Based Assessment or Collaborative Lesson
- 01.08 Module One Practice Test
- 01.09 Module One Test Part 1
- 01.09 Module One Test Part 2

Module 02 Limits and Continuity

- 02.00 Module Two Checklist and Pretest
- 02.01 Introduction to Limits
- 02.02 Properties of Limits
- 02.03 Limits Involving Infinity
- 02.04 Continuity
- 02.05 Applications of Limits
- 02.06 Discussion-Based Assessment or Collaborative Lesson
- 02.07 Module Two Practice Test
- 02.08 Module Two Test Part 1
- 02.08 Module Two Test Part 2

Module 03 Differentiation

- 03.00 Module Three Checklist and Pretest
03.01 The Derivative
03.02 Rules of Differentiation
03.03 Trigonometric Derivatives and the Chain Rule
03.04 Inverse Functions
03.05 Exponential and Logarithmic Functions
03.06 Derivatives of Exponential, Logarithmic, and Inverse Trig Functions
03.07 Implicit Differentiation
03.08 Discussion-Based Assessment or Collaborative Lesson
03.09 Module Three Practice Test
03.10 Module Three Test Part 1
03.10 Module Three Test Part 2

Module 04 Applications of Derivatives

04.00 Module Four Checklist and Pretest
04.01 Analyzing Functions Part I: Curve Sketching
04.02 Analyzing Functions Part II: Maximums and Minimums
04.03 Applied Maximum and Minimum Problems
04.04 Distance, Velocity, Acceleration, and Rectilinear Motion
04.05 Related Rates
04.06 The Mean-Value Theorem and L'Hôpital's Rule
04.07 Linearization
04.08 Discussion-Based Assessment or Collaborative Lesson
04.09 Module Four Practice Test
04.10 Module Four Test Part 1
04.10 Module Four Test Part 2

Module 05 Integration

05.00 Module Five Checklist and Pretest
05.01 Area Approximation and Riemann Sums
05.02 Introduction to the Definite Integral
05.03 The Fundamental Theorem of Calculus
05.04 Integrals and Antiderivatives
05.05 Integration by Substitution
05.06 The Definite Integral
05.07 Discussion-Based Assessment or Collaborative Lesson
05.08 Module Five Practice Test
05.09 Module Five Test Part 1
05.09 Module Five Test Part 2

Module 06 Application of Integrals

06.00 Module Six Checklist and Pretest
06.01 Finding the Area Under and Between Curves
06.02 Volume by Discs (Slicing)
06.03 Average Value of a Function and Rectilinear Motion Revisited
06.04 Discussion-Based Assessment or Collaborative Lesson
06.05 Module Six Practice Test
06.06 Module Six Test Part 1
06.06 Module Six Test Part 2
06.07 Segment One Practice Exam
Segment II

Module 07 Differential Equations and More Riemann Sums

- 07.00 Module Seven Checklist and Pretest
- 07.01 Differential Equations—An Introduction
- 07.02 Initial Value Problems and Slope Fields
- 07.03 Numerical Approximation Methods with Integrals
- 07.04 Discussion-Based Assessment or Collaborative Lesson
- 07.05 Module Seven Practice Test
- 07.06 Module Seven Test Part 1
- 07.06 Module Seven Test Part 2

Module 08 Supplemental Topics

- 08.00 Module Eight Checklist and Pretest
- 08.01 Exploring the Graphs of f, f Prime, and f Double Prime
- 08.02 Relative Rates of Growth
- 08.03 Using Calculus with Data in a Table
- 08.04 Functions Defined by Integrals
- 08.05 Integration by Parts
- 08.06 Integration Using Partial Fractions
- 08.07 Improper Integrals
- 08.08 Discussion-Based Assessment or Collaborative Lesson
- 08.09 Module Eight Practice Test
- 08.10 Module Eight Test Part 1
- 08.10 Module Eight Test Part 2

Module 09 Analytic Geometry

- 09.00 Module Nine Checklist and Pretest
- 09.01 Parametric Curves
- 09.02 Polar Curves
- 09.03 Vector Curves
- 09.04 Length of Planar Curves
- 09.05 Area of Planar Curves (Polar Curves Only)
- 09.06 Discussion-Based Assessment or Collaborative Lesson
- 09.07 Module Nine Practice Test
- 09.08 Module Nine Test Part 1
- 09.08 Module Nine Test Part 2

Module 10 Series and Convergence

- 10.00 Module Ten Checklist and Pretest
- 10.01 Series
- 10.02 Convergence
- 10.03 Tests for Convergence Part I
- 10.04 Tests for Convergence Part II
- 10.05 Error Bound
- 10.06 Discussion-Based Assessment or Collaborative Lesson
Module 11 Polynomial Series and Approximations

- 11.00 Module Eleven Checklist and Pretest
- 11.01 Maclaurin Series
- 11.02 Taylor Series and Error Bound
- 11.03 Power Series
- 11.04 Radius and Interval of Convergence of Power Series
- 11.05 Applications of Polynomial Series
- 11.06 Discussion-Based Assessment or Collaborative Lesson
- 11.07 Module Eleven Practice Test
- 11.08 Module Eleven Test Part 1
- 11.08 Module Eleven Test Part 2
- 11.09 Segment Two Practice Exam
- 11.10 Segment Two Exam Part 1
- 11.10 Segment Two Exam Part 2

Module 12 Getting Ready for the Exam

- 12.00 Module Twelve Checklist
- 12.01 Test Format—MC Part A
- 12.02 Using a Calculator—MC Part B
- 12.03 The Free Response Section
- 12.04 Common Mistakes. How Is the Exam Scored?

Course Assessment and Participation Requirements:

To achieve success, students are expected to submit work in each course weekly. Students can learn at their own pace; however, “any pace” still means that students must make progress in the course every week. To measure learning, students complete self-checks, practice lessons, multiple choice questions, projects, discussion-based assessments, and discussions. Students are expected to maintain regular contact with teachers; the minimum requirement is monthly. When teachers, students, and parents work together, students are successful.