

Honors Calculus Syllabus  
Encompass Academy High School  
Mr. Adam Khan  
2019 - 2020  
E-mail: adam@encompassacademy.org



**Course Description:** Calculus is the study of how things change. It provides a framework for modeling systems in which there is change, and a way to deduce the predictions of such models. This course is designed to give students an overview of Calculus topics such as limits and continuity, derivatives, anti-derivatives, integrals and differential equations. Course Topics will include:

1. Functions, Limits, Continuity
2. Derivatives
3. Applications of Derivatives
4. Integration
5. Applications of Definite Integrals
6. Transcendental Functions
7. Integration Techniques

**Grading Policy:**

20% Midterm Exam  
40% Weekly Quizzes (lowest score dropped at end of semester)  
20% Homework/classwork  
20% Semester Final

Projects may be counted as tests or HW

**Grading Scale:**

A: 90% - 100% B: 80% - 89.99% C: 70% - 79.99% D: 60% - 69.99% F: 0% - 59.99%

**Homework/Classwork:** Just like sports, music, and numerous essential skills, practice is essential to mastery in mathematics. If there's no struggle, there's no progress. Much like sweating and working through frustrating performance plateaus in sports or physical training, you can work through the struggle in math by using the skills you already have, developing new skills I will teach you, and using the resources available to you (tutorials, website, texts, study groups, tutors, online, etc.) Some of your practice will be in class, sometimes it might be done with your peers, often it will involve your calculator, but it will always involve your deliberate, concentrated efforts.

There will be homework. You will typically have two school days to complete each assignment. Assignments should be completed as much as possible on the first night, leaving a school day to ask questions and/or receive tutoring prior to the assignment being due. Assignments will be collected each Thursday.

**Notes:** All notes should be kept organized in chronological order starting in the front of your notebook. Do not throw away old notes. If you are absent, it is your responsibility to get the notes from a classmate.

**Grading**

To obtain an "A" grade on work done, all problems must be neatly completed and be free of errors. Students with excused absences are allotted an extra day to complete assignments. Late work may only be turned in while the unit in question is still being covered for half credit.

**End of class procedure:**

Before any student is dismissed, all students must be sitting in their seats. All classroom materials must be returned to their proper place. There may not be any trash on the tables or floor. The teacher dismisses the class, not the bell.

**Tests and Quizzes:**

There will be a quiz every Thursday. There will be one midterm each semester and a cumulative exam at the end of each semester. Quizzes are closed note and on exams you will get a "cheat card".

**Student Honesty Policy**

All students deserve a quiet testing environment. You are expected to do your own work on tests, quizzes, etc. It is inappropriate if it appears to me that you are looking at another student's test or that you are helping someone during a test or talking/disrupting others. A student will receive a zero on a quiz/test for any of these infractions.

**Classroom Rules/Expectations:**

- Students are expected to follow all regulations stated in the Encompass Academy High School Handbook.
- The utmost respect for classmates, teachers and self will be expected. Respect mistakes, and differences.
- No profanity, teasing, or put-downs. Raise your hand to be called on!
- Be in your seat at the start of class.
- Be prepared with materials and assignments.
- Follow Directions.
- Put all trash in trash can.

**Disciplinary Policy:**

- Verbal Reminder/ Warning
- Asked to leave classroom
- Phone call/note home
- Visit to the Office
- Students may be sent directly to the Office, if deemed appropriate.
- Chuck Norris style roundhouse to the chin.

\*All rules may be amended at the discretion of the instructor.

\*The instructor reserves the right to modify this syllabus for the needs of the class.

**Course Outline****Unit 1 -- Functions, Graphs, Limits and Continuity (3 weeks)**

- 1.0 Slopes & Velocities
- 1.1 Limit of a Function
- 1.2 Limit Properties
- 1.3 Continuous Functions
- 1.4 Formal Definition of Limit

**Unit 2 -- The Derivative (6 weeks)**

- 2.0 Slope of a Tangent Line
- 2.1 Definition of Derivative
- 2.2 Differentiation Formulas
- 2.3 Chain Rule
- 2.4 Related Rates
- 2.5 Newton's Method
- 2.6 Implicit Differentiation

Unit 3 -- Derivatives and Graphs (*6 weeks*)

- 3.0 Introduction to Maximums & Minimums
- 3.1 Mean Value Theorem
- 3.2  $f'$  and the Shape of  $f'$
- 3.3  $f''$  and the Shape of  $f''$
- 3.4 Applied Maximums & Minimums
- 3.5 Asymptotes
- 3.6 L'Hospital's Rule

Unit 4 -- The Integral (*6 weeks*)

- 4.0 Introduction to Integrals
- 4.1 Sigma Notation & Riemann Sums
- 4.2 The Definite Integral
- 4.3 Properties of the Definite Integral
- 4.4 Areas, Integrals and Antiderivatives
- 4.5 The Fundamental Theorem of Calculus
- 4.6 Finding Antiderivatives
- 4.7 First Applications of Definite Integrals
- 4.8 Using Tables to Find Antiderivatives
- 4.9 Approximating Definite Integrals

Unit 5 -- Applications of Definite Integrals (*5 weeks*)

- 5.0 Introduction to Applications
- 5.1 Volumes
- 5.2 Arc Lengths & Surface Areas
- 5.3 More Work
- 5.4 Moments & Centers of Mass
- 5.5 Additional Applications

Unit 6 -- Introduction to Differential Equations (*3 weeks*)

- 6.0 Introduction to Differential Equations
- 6.1 Differential Equation  $y'=f(x)$
- 6.2 Separable Differential Equations
- 6.3 Exponential Growth, Decay & Cooling

Unit 7 -- Inverse Trigonometric Functions (*if time permits, 3 weeks*)

- 7.0 Introduction to Transcendental Functions
- 7.1 Inverse Functions
- 7.2 Inverse Trigonometric Functions
- 7.3 Calculus with Inverse Trigonometric Functions

Unit 8 -- Improper Integrals and Integration Techniques (*if time permits, 2 weeks*)

- 8.0 Introduction Improper Integrals & Integration Techniques
- 8.1 Improper Integrals
- 8.2 Integration Review
- 8.3 Integration by Parts
- 8.4 Partial Fraction Decomposition
- 8.5 Trigonometric Substitution
- 8.6 Trigonometric Integrals

**Please return to class by August 15th**

Calculus: Student and Parent Signatures

This verifies that I have read the above information as it was explained in the handout and discussed in class. I understand what is expected of me and will give this class my hard work.

Student Name (printed) \_\_\_\_\_ Date \_\_\_\_\_

Student Signature \_\_\_\_\_

This verifies that I have read and discussed the above information with my student.

Parent/Guardian Name (printed) \_\_\_\_\_ Date \_\_\_\_\_

Parent/Guardian Signature \_\_\_\_\_

Parent's Preferred E-mail or Telephone Number \_\_\_\_\_

Thank you! I look forward to working with you and your child this year! – Mr. Khan