Academic Calculus Course Expectations

Teacher:	Mrs. Reyes	**Classroom:**	205
Phone:	860-535-0377	**Email:**	reyesa@northstonington.k12.ct.us

Course Overview

The main objective of this course is to enable students to utilize their prior knowledge to provide an introduction to calculus to help students transition into college level calculus. The course emphasizes a multi-representational approach to calculus; with concepts, results and problems being expressed graphically, numerically, analytically and verbally. The four major topics that are covered are limits, derivatives, indefinite integrals and definite integrals. The emphasis of instruction is to balance teaching the skills, understanding the concepts to make connections and the use of technology to explore, discover and reinforce the concepts of calculus.

Course Objectives

- Students should be able to work with functions represented in a variety of ways: graphical, numerical, analytical or verbal. They should understand the connections among these representations.
- Students should understand the meaning of the derivative in terms of a rate of change and local linear approximation and should be able to use derivatives to solve a variety of problems.
- Students should understand the meaning of the definite integral both as a limit of Riemann sums and as the net accumulation of change and should be able to use integrals to solve a variety of problems.
- Students should understand the relationship between the derivative and the definite integral as expressed in both parts of the Fundamental Theorem of Calculus.
- Students should be able to communicate mathematics and explain solutions to problems both verbally and in written sentences.
- Students should be able to model a written description of a physical situation with a function, a differential equation or an integral.
- Students should be able to use technology to help solve problems, experiment, interpret results and support conclusions.
- Students should be able to determine the reasonableness of solutions, including sign, size, relative accuracy and units of measurement.
- Students should develop an appreciation of calculus as a coherent body of knowledge and as a human accomplishment.

Prerequisites

Before studying calculus, all students should complete courses in which they study algebra, geometry, trigonometry, analytic geometry and elementary functions. These functions include linear, polynomial, rational, exponential, logarithmic, trigonometric, inverse trigonometric and piecewise-defined functions. In particular, before studying calculus, students must be familiar with the properties of functions, the algebra of functions and the graphs of functions. Students must also understand the language of functions (domain and range, odd and even, periodic, symmetry, zeros, intercepts and so on) and know the values of the trigonometric functions at specified numbers.

Class/ Behavior Expectations

- Be respectful, responsible, honest, and safe to self, others, and all property.
- Be on time and prepared for class.
- Be active and involved in learning.
- All school rules and policies as stated in the handbook apply.
- The use of technology (iPods, phones, laptops) is prohibited in this classroom unless directed by the instructor. All technology should be kept in lockers or backpacks. If used without permission, the technology will be confiscated and kept until the end of the period. Multiple offenses will result in teacher detentions and/or office blue slips.

Homework

Homework will be given often in this class. The assignment will either be checked and graded for completion or collected and graded for accuracy. The assignment may include a short practice set of problems or watching a video to reinforce skills from class. There will also be graded homework assignments that will be collected and graded.

Notebook

Students are required to have a binder or a section of a binder for this class. Students should keep all assignments to help prepare for the midterm and final exam.

Teaching Strategies

Students are taught that ideas can be investigated analytically, graphically and numerically. Students are expected to relate the various representations to each other. Students are encouraged to explore and discover whenever possible and work with each other.

Technology

Students will use both the TI-83/84. They will be issued a TI-83/84 if needed. Calculators are used to explore, discover and reinforce the concepts of calculus throughout the course.

Extra help

Seek help immediately. I will be available for students whenever possible for extra help. Students need to make arrangements to see me for extra help in advance.

Topics

Section	*Topic*
1.1	Four Ways to Represent a Function
1.2	Mathematical Models
1.3	New Functions from Old Functions
1.4	Graphing Calculators
1.5	Exponential Functions
1.6	Inverse and Logarithms
2.1	The Tangent and Velocity Problems
2.2	The Limit of a Function
2.3	Limit Laws
2.4	The Precise Definition of a Limit
2.5	Continuity
2.6	Limits at Infinity; Horizontal Asymptotes
2.7	Derivatives and Rates of Change
2.8	Derivative as a Function
3.1	Derivatives of Polynomials and Exponential Functions
3.2	The Product and Quotient Rules
3.3	Derivatives of Trigonometric Functions and Inverse Functions
3.4	The Chain Rule
3.5	Implicit Differential
3.6	Derivatives of Logarithmic Functions
3.7	Rates of Change in the Natural and Social Sciences
3.8	Exponential Growth and Decay
3.9	Related Rates
3.10	Linear Approximations and Differentials
4.1	Minimum and Maximum Values
4.2	The Mean Value Theorem
4.3	How Derivatives Affect the Shape of a Graph
4.4	Indeterminate Forms and l'Hospital's Rule
4.5	Summary of Curve Sketching
4.6	Graphing with Calculus and Calculators
4.7	Optimization Problems
4.8	Newton's Method
4.9	Antiderivatives
5.1	Areas and Distances
5.2	The Definite Integral
5.3	The Fundamental Theorem of Calculus
5.4	Indefinite Integrals and the Net Change Theorem
5.5	The Substitution Rule

6.1	Area between Curves
6.2	Volumes
6.3	Volumes by Cylindrical Shells
6.4	Work
6.5	Average Value of a Function
	If time permits:
7.1	Integration by Parts
7.2	Trigonometric Integrals
7.3	Trigonometric Substitution
7.5	Strategy for Integration
7.7	Approximate Integration

Grading Policy
Total point system

Tests	100 points
Quizzes	20-50 points
Homework/In-class assignments	4-20 points
Graded Homework	20-50 points
AP Practice	5-20 points
Projects	100 points

Final Assessment Policy:
For one credit or half-credit full year courses, *course assessments* (exams/activity) are given at the conclusion of each semester, a mid-term and a final. For half-credit courses, a *course assessment* (exam/activity) will be given at the end of the semester. All *course assessments*, except in selected classes, are one and one-half hours in length. All students must arrive on time and remain in class for the full duration of the period. Students taking the AP test will not be required to sit for a final exam. **Seniors are exempt from taking a *final course assessment*, in any course where the students have at least a 90 average.** Physical Education classes will not be required to give an exam, but there will be a health exam which could be given earlier. Normally, no excuse for missing a *course assessment* other than illness will be accepted. The principal must give such permission.

Wheeler High School Academic Expectations:

- Literacy
- **Analysis (assessed in this course)**
- Collaboration
- Communication

Major Text
Stewart, James. *Single Variable Calculus Early Transcendentals*: 7th ed. Belmont, CA: Brooks/Cole 2012.