City University of New York (CUNY)
CUNY Academic Works

Open Educational Resources | Queens College

2026

Math 141 Calculus I (Queens College)

Anisha Clarke
Queens College, aclarke@qc.cuny.edu

How does access to this work benefit you? Let us know!

More information about this work at: https://academicworks.cuny.edu/qc_oers/156
If you have a disability and have trouble accessing this content, please report the issue!
Discover additional works at: https://academicworks.cuny.edu

This work is made publicly available by the City University of New York (CUNY).
Contact: AcademicWorks@cuny.edu

Math 141 Calculus/Differentiation
Department of Mathematics, Queens College

Course Description
Math 141 is the first part of a three-semester calculus sequence (MATH 141, 142, 143). In this course we will compute and apply the fundamental concepts of calculus, including limits, continuity, and derivatives. We will emphasize making connections between graphical and algebraic representations. (3 credits; Satisfies Pathways MQR Requirement).

By the end of the course, you should be able to:

- Evaluate limits
- Differentiate functions
- Solve related rates applications
- Solve min/max applications
- Apply methods of calculus to sketch curves

Prerequisites
Grade C- or better in Math 122 (Precalculus), or placement by the Department. You need a strong foundation in algebra and trigonometry.

General Resources
This class uses open educational resources or zero-textbook-cost materials. There are no required textbooks for purchase. All materials are freely available or will be provided by the instructor. Funded in part by the CUNY OER Initiative.

- Textbook: OpenStax Calculus Volume I
- Homework: MyOpenMath
- Course hub: Brightspace
- No calculators with computer algebra systems**

To keep the course zero cost, we will focus on understanding concepts without using a graphing calculator. We will use Desmos in class to explore ideas and make connections; however, exams will measure your ability to calculate and interpret your results. This approach should also strengthen your algebra and number sense, which are essential for success in calculus.
*** Allowed: small four-function calculator*

Grading
Homework on MyOpenMath: 10%
Weekly quizzes based on MyOpenMath homework: 15%
3 in-class exams, one per unit:15% each
Department Cumulative Final Exam: 30%

Class preparation

Each class meeting will have assigned preparation materials, readings from the textbook and short videos. Complete the assigned preparation before class. These materials introduce key ideas and vocabulary so that class time can be focused on examples, problem-solving, and deeper understanding. Instruction will assume some familiarity with the material.

This work is licensed under a Creative Commons Attribution 4.0 License.

Reviewing prerequisite skills/preparing for each class
Reviewing the related prerequisite skills will help you focus on the new calculus ideas. Each calculus topic relies on skills from algebra, trigonometry, and precalculus. Many difficulties students encounter in calculus are actually caused by gaps in these prerequisite skills rather than the calculus itself.
Resource: Stewart Algebra Review

If you would like additional support with algebra or precalculus topics, the video playlists on Seth Teaches Math provide explanations and worked examples on many of the prerequisite skills we will use throughout this course. These playlists are resource for reviewing concepts and refreshing skills as they arise during the semester.
Resource: Seth Teaches Math Playlists

Time Commitment Outside of Class
Success in calculus will require you to engage with the course content outside of class. Plan to spend at least 4–5 hours per week preparing for class, completing readings and videos, doing homework, and reviewing notes. Spend more time reviewing prerequisite algebra or precalculus skills, if needed.

Homework (MyOpenMath)
MyOpenMath is a free tool designed to help you practice and develop your math skills. Use the homework to practice thinking through problems. Use "Get a similar question" feature to try solving one problem correctly more than once. Using AI to generate answers may help you finish quickly and get a good score, but it prevents you from learning the ideas needed to succeed on quizzes, exams, and future courses. You will have homework after each class session, and due at the start of the next class meeting.

Getting Started with MyOpenMath:

- Go to the MyOpenMath website and click "Register as a New Student"
- Enter your course ID (provided by your instructor)
- Create a username and password, then enroll in the course
- If you already have an account, log in and join using the course ID.

Weekly quizzes
Quizzes will be given every Thursday we meet, during the first 15 minutes of class. Studying weekly for quizzes will keep you engaged with the material on a regular basis and develop strong study habits. Quizzes will identify what you understand, what needs more work, and what you need help with before unit exams.

Unit Exams
There will be three in-class unit exams: limits & continuity; derivatives; applications of derivatives. Exams will assess your understanding of key concepts and your ability to apply them. Regular practice and consistent engagement with the material will help you prepare and succeed.

Department Final Exam
During final exam week, you will take a cumulative Math 141 exam, given by the Department. You can review and practice using past Math 141 finals.

Course Schedule
The course schedule is organized into units, with each unit divided into standards that identify the specific skills and concepts you are expected to learn. Learning objectives for each Standard can be found at the

This work is licensed under a Creative Commons Attribution 4.0 License.

start of the relevant textbook section. For each standard below, you will find: *Before You Begin* section, *Read* assignments, and *Watch* assignments.

Before You Begin: Each topic in calculus builds on skills from algebra, trigonometry, and precalculus. Review the prerequisite skills before starting the calculus topic.

Read: Assigned readings introduce key definitions, examples, and ideas before we discuss them in class. Read before class to prepare for the lectures.

Watch: Videos introduce important concepts and help you visualize mathematical ideas. Watch the assigned videos before class so that class time can focus on problem-solving and deeper understanding.

UNIT 1: LIMITS & CONTINUITY

Standard 1: Introduction to Limits

Before you begin: Function notation, evaluating functions, interpreting graphs, toolkit functions characteristics (linear, quadratic, polynomial, power functions, rational, radical, exponential, logarithmic, trigonometric), domain and range, function transformations, piecewise functions, rationalizing denominators/numerators, function composition

Read: Section 2.1 (Optional) and Section 2.2
Watch: Introduction to Limits, One-sided Limits

Standard 2: Limits from Graphs

Before you begin: Reading and interpreting graphs, piecewise functions, function notation, domain and range, graphs of toolkit functions, vertical and horizontal asymptotes
Read: Section 2.2
Watch: Limits from Graphs

Standard 3: Finding Limits Algebraically

Before you begin: Evaluating functions, simplifying algebraic expressions, operations with fractions, factoring polynomials

Read: Section 2.3
Watch: Finding Limits Algebraically Introduction

Standard 4: Limit Laws

Before you begin: Exponent rules, simplifying algebraic expressions, polynomial operations, operations with fractions and rational expressions, evaluating functions
Read: Section 2.3
Watch: Properties of Limits, Limits and the Sandwich Theorem, Trigonometric Limits

Standard 5: Limits by Factoring & Rationalizing

Before you begin: factoring polynomials, difference of squares, simplifying rational expressions, rationalizing, operations with radicals
Read: Section 2.3
Watch: Limits of Rational Functions, Limits of Radical Functions, Limits of Compound Fractions

This work is licensed under a Creative Commons Attribution 4.0 License.

Standard 6: Continuity
Before you begin: Evaluating limits, function notation, function composition, piecewise functions, simplifying rational expressions, rationalizing, graph interpretation, domain restrictions, solving a system of equations, domain of functions
Read: Section 2.4
Watch: Continuity, Continuity continued, Intermediate Value Theorem

Standard 7: Limits at Infinity
Before you begin: End behavior of functions, polynomial functions, rational functions and asymptotes, exponent rules
Read: Section 4.6
Watch: Limits of and at Infinity, Limits of and at Infinity Part 2

Exam 1 (Unit 1)

UNIT 2: DERIVATIVES

Standard 8: Definition of Derivative and Rates of Change
Before you begin: slope of a line, equation of a line, simplifying the difference quotient, simplifying fractional expressions, rationalizing
Read: Section 3.1 and Section 3.4
Watch: Tangent Lines, Derivative from Definition Part 1, Derivative from Definition Part 2

Standard 9: Derivative as a Function
Before you begin: function notation, interval notation, evaluating functions, simplifying the difference quotient, increasing/decreasing function
Read: Section 3.2
Watch: Derivatives at Cusps and Discontinuities, Derivatives from Graphs

Standard 10: Power Rule
Before you begin: Exponent rules, negative, radical, and rational exponents, simplifying expressions, operations with fractions
Read: Section 3.3
Watch: Simple Derivatives

Standard 11: Product & Quotient Rules
Before you begin: Multiplying polynomials, factoring expressions, simplifying rational expressions, operations with fractions, function decomposition
Read: Section 3.3
Watch: The Product Rule, The Product and Quotient Rules, Properties of Derivatives

Standard 12: Chain Rule
Before you begin: function decomposition, evaluating functions, factoring expressions with negative exponents
Read: Section 3.6
Watch: The Chain Rule

This work is licensed under a Creative Commons Attribution 4.0 License.

Standard 13: Trig Derivatives
Before you begin: Unit circle and special angle values, reciprocal and quotient identities, radian measure, graphs/domain/asymptotes of trig functions, Pythagorean identities
Read: Section 3.5
Watch: Derivatives of Trigonometric Functions

Standard 14: Implicit Differentiation
Before you begin: simplifying expressions, solving literal equations, in/dependent variables, factoring, product and chain rules, rules for exponents, equation of a line, product and chain rules
Read: Section 3.8
Watch: Implicit Differentiation

Standard 15: Related Rates
Before you begin: area and volume formulas, similar triangles and proportions, right-triangle trigonometry, implicit differentiation with respect to time
Read: Section 4.1
Watch: Related Rates

Standard 16: Linear Approximation
Before you begin: equation of a line, evaluate derivatives at a point, evaluating functions, operations with decimals, interpreting concavity
Read: Section 4.2
Watch: Linear Approximations, Tangent Line Approximations

Exam 2

UNIT 3: APPLICATIONS OF DERIVATIVES

Standard 17: Max & Min Values
Before you begin: finding critical numbers, solving equations, interval notation, evaluating functions and their derivatives
Read: Section 4.3
Watch: Optimization Part 1, Optimization Part 2

Standard 18: Mean Value Theorem
Before you begin: continuity, differentiability, calculating average rate of change, finding derivative, solving equations for a variable
Read: Section 4.4
Watch: Mean Value Theorem

Standard 19: Increasing/Decreasing & Concavity (Derivatives and shapes of graphs)
Before you begin: derivative rules, solving equations, factoring, finding where a function is undefined, testing intervals using critical numbers
Read: Section 4.5
Watch: Graphs from Derivatives Part 1, Graphs from Derivatives Part 1

This work is licensed under a Creative Commons Attribution 4.0 License.

Standard 20: Curve Sketching
Before you begin: graphs and characteristics of toolkit functions, asymptotes and limits at infinity, first derivative analysis (increasing/decreasing), second derivatives analysis (concavity), plotting points to sketch a graph
Read: Section 4.6
Watch: Graphs from Derivatives Part 3, Graphs from Derivatives Part 4

Standard 21: Optimization
Before you begin: translating word problems into/solving simultaneous equations, solving equations, geometry and distance formulas, establishing domain boundaries, max/min numbers
Read: Section 4.7
Watch: Optimization Part 3

Standard 21: Optimization continued

Before you begin: translating word problems into/solving simultaneous equations, solving equations, geometry and distance formulas, establishing domain boundaries, max/min numbers

Read: Section 4.7
Watch: Optimization Part 4

Exam 3

This work is licensed under a Creative Commons Attribution 4.0 License.