MTH 150 Syllabus

Spring 2026

Peter Keep

Welcome to MTH 150 - Calculus I/Analytic Geometry! This course syllabus will serve as a repository for all of the course details, policies, and any other required information to meet college and state requirements.

This document might be a bit hard to navigate, and it can sometimes be hard to read. We'll try to highlight the most important and essential parts for students on the course website.

1 Faculty and Section Information

1.1 Faculty Information

Table 1.1

Instructor Name:	Peter Keep
Email:	keepp@morainevalley.edu
Office:	A230
Mailbox:	C154
Office Phone:	(708) 974-5614
Testing Center File #:	564

1.2 Office Hours

Office hours this semester are:

- Mondays: 12:30pm–2:30pm
- Thursdays: 10:30am–12:30pm

These 4 hours are times when I am *guaranteed* to be in my office.

Note 1.2 If I am unavailable during an office hour or need to re-schedule an office hour temporarily, I will post a note on my office door and send a message to the class.

You do not need to set up an appointment or inform me before-hand that you're coming, unless you'd like for me to prepare something specific for our meeting. Otherwise, these are just drop-in hours for students in my courses.

If you would like to meet outside of these times, then we can set up a time that works in both of our schedules.

1.3 Section Information

Table 1.3 Section Information

Section Number:	001
Room Number:	D125
Meeting Times:	M/W 10:00am–12:15pm
Modality:	Traditional (face-to-face)
First Class:	01/12/2026
Last Class:	05/06/2026
Final Exam (Part 1):	05/04/2026
Final Exam (Part 2):	05/06/2026

2 Course Information

2.1 Course Identification

Table 2.1

Course Number:	MTH 150
Course Title:	Calculus I/Analytic Geometry
Credit Hours:	5 (Lecture/Demonstration)
Total Contact Hours/Week:	5

2.2 Catalog Description

Prerequisites

Appropriate placement test score, or MTH 141 (College Algebra) and MTH 142 (Trigonometry) with a minimum grade of "C."

Course Description

Topics include limits, continuity, the derivative, applications of differentiation, curve sketching, antidifferentiation, and the definite integral. These topics are applied to polynomial, radical, rational, logarithmic, exponential, trigonometric, and hyperbolic functions. Note: No more than five semester hours of credit will be granted to students taking both MTH 145 and MTH 150.

Illinois Articulation Initiative number: MTH 901

2.3 Major Course Concepts

1. Limits and continuity
2. Derivatives
3. Applications of the derivative
4. Antiderivatives and definite integrals
5. Exponential and logarithmic functions
6. Trigonometric and hyperbolic functions

2.4 Expected Outcomes for Student Learning

Course Student Learning Outcomes

Upon completion of this course, a student will be able to:

1. Evaluate limits graphically, numerically, and analytically, including infinite limits and limits at infinity.
2. Analyze functions graphically and numerically and determine the continuity of the function at fixed points in its domain.
3. Compute derivatives of polynomial, radical, rational, trigonometric, exponential, and logarithmic functions.
4. Explain the relationship between the derivative and each of the following: the slope of a tangent line to a function, the velocity and acceleration of an object.
5. Solve applied problems involving related rates of change, the velocity or acceleration of an object, and optimization.
6. Find the critical points of a function and determine the intervals where a function increases and decreases.
7. Determine the intervals over which a function is concave up and concave down and identify any inflection points.
8. Use the First and Second Derivative Tests to identify local extrema.
9. Use the first and second derivatives in curve sketching.
10. Use L'Hopital's Rule to evaluate limits and indeterminate forms.
11. Find the indefinite integral of functions involving or resulting in polynomial, radical, rational, trigonometric, exponential, and logarithmic functions.
12. Explain the relationship between the area under the curve and the definite integral.
13. Evaluate the definite integral of functions involving polynomial, radical, rational, trigonometric, exponential, and logarithmic functions.
14. Evaluate definite and indefinite integrals using substitution.

Common Learning Outcomes

Quantitative Literacy: Use processes, procedures, data or evidence to solve problems and make effective decisions.

3 Books and Supplies

3.1 Textbook

We will not be using a traditional textbook in this course. This semester we will be using a free and open source calculus textbook, called *Discover Calculus*. You can find the link to the textbook website, pdf, and relevant portions of the textbook on Canvas.

3.2 Calculators

Similarly, we will not be using any specific calculators this semester. You can bring a calculator that you're comfortable with to class if you'd like, and we'll make use of free graphing tools like Desmos in class.

Calculators with a computer algebra system are prohibited on any graded work.

4 Classroom Policies and Procedures

4.1 Attendance and Participation

Participation in this class is crucial for student success. This obviously includes the expectation that students will attend class sessions. But more than that, we will expect that you come to class prepared, following along with the schedule, and ready to participate.

4.2 Academic Integrity

Mathematics Department Statement on Academic Integrity

The Department of Mathematics views upholding academic integrity as an integral part of student learning, classroom engagement, and ultimately, the production of student-generated work. The Department believes adherence to the principles stated in the MVCC Code of Academic Integrity preserves the value of assigned grades and other assessments. Instances of academic dishonesty compromise the development of problem-solving skills and other skills necessary for subsequent work in mathematics, depriving students of an authentic learning experience. Overall, we believe integrity in the mathematics classroom translates into ethical behavior beyond academia.

Course Policy

There is a lot of research literature on cheating, and specifically cheating in math classes. One of the driving motivators for Academic Dishonesty in classes like this one is desperation. I have tried to introduce some grading policies that reduce stress by getting rid of whatever high-stakes exams that I can, but I still want to say: *if you are in a position where you feel the need to cheat in order to succeed, please talk to me first. I am happy to help!* We can set up a plan to retake whatever you're working on in a way that removes the need to cheat within the confines of the semester.

Instead of a list of things that you can or cannot do on individual assessments, just make sure that you are representing your own understanding and learning honestly.

Repeated instances of Academic Dishonesty will result in a failing grade for the course.

A Note on Generative AI and LLMs

The short version of this note is, simply, "Don't use them."

The medium-length version of this note is is that this course is one that will require you, first of all, to think deeply. The course includes calculations, computations, and other things like that, but most important is the deep thinking we'll do about the objects we learn about, the properties of them, and how they interact with each other. My stance is that there is no practical,

helpful, or ethical way to use generative AI and large language models to accomplish or assist with this.

I promise you that in whatever task or process you consider, these tools will do a less-than-good job and reduce your opportunity to think deeply. Mathematics is a communal activity, done by communicating with each other. While I hope that this class reflects this, I implore you to choose human communication whenever you might otherwise decide to use a tech company's forgery of dialogue.

For the long version of this note, or for some ideas of productive alternatives to whatever you might think to use a generative AI tool for, please visit me in office hours or send me an email. I'd love to talk with you about ways that we can reduce our reliance on the tech industry.

Last, and equally important, I ask that you respect me and the work I've done by refraining from inputting my textbook, course notes, activities, practice problems, or examples into these tools for any reason.

4.3 Email and Messaging

When you email me or message me on Canvas, make sure to include your name and which class you're in, especially at the beginning of the semester while I get to know everyone. I will try to respond to your emails within 2 business days, but I may take longer depending on the question itself or the timing in the semester.

4.4 Withdrawal Deadline

A student who does not withdraw officially from a course may receive a grade of "F" depending on course progress or course attendance.

Table 4.1

Last date to drop and get a refund:	01/20/2026
Last date to drop with a "W" grade:	04/07/2026

Note 4.2 If you have a hold on your record which prevents you from dropping classes online, you must either visit the Registration Office (S111A) or call (708) 974-2110 to drop classes during normal business hours

4.5 Accommodations

I am committed to creating an environment where every student feels empowered and able to learn. If you anticipate or experience any barriers to learning in this course, please contact me. You can talk with me before or after class, visit my office hours, or email me a note with your concerns. I am happy to talk with you about some possible solutions that don't compromise the intent of the assessments in this class.

If you have a disability or think you may have a disability, please contact the Center for Disability Services (disability.services@morainevalley.edu or 708-974-5711) to learn how to get approved for relevant accommodations. If you have already been approved for accommodations through the CDS, let me know so that we can discuss how to best implement and apply those accommodations that you are entitled to.

5 Grading Policies

This class will use a grading scheme called "Standards Based Grading" this semester. It is different from a traditional points-based grading system in several ways:

- There are no points or number grades on anything. Instead, we'll focus on feedback instead of numbers.
- Every assignment or assessment that is turned in for a grade will be aligned with a topic in the class that you are graded on. Your submitted work will either meet the expectations for that topic (we'll call these "graded standards") or it will not.
- You can retake things to update your grade on a standard.

5.1 Main Standards

These are the essential topics in the course that anyone can expect a student from this course (or an equivalent one at a different institution) to cover. Students should expect to be able to demonstrate their understanding of all (or almost all) of these topics by the end of the semester.

Continued Learning

Demonstrating that you understand a topic in the class is great, but is not everything. A portion of your grade will be based on whether you are able to continue to demonstrate your understanding of the Main Standards throughout the semester. These Continued Learning requirements are met when you meet a Main Standard for the second time (whether that is by retaking something or demonstrating it on a different assignment)

5.2 Extra Standards

These are topics in the course that are not as critical but still useful, interesting, and commonly included in courses that are equivalent to this one. Sometimes they are extensions of some of the topics from the Main Standards, and sometimes they are truly extra topics that can be discussed in the same way as the main standards.

5.3 Grading Scale

Instead of focusing on a number grade for any assignments, the focus will be on feedback and growth. I will try to leave helpful comments when your answers are incorrect so that you can continue to learn.

For every grade, you will get marked categorically:

- *Cannot Assess:* the answers might be incomplete or missing, so that I cannot assess what you know.
- *Needs Work:* there are enough mistakes, or big enough mistakes, where it is clear that some more work is needed on this topic.
- *Meets Expectations:* these answers are good, and while there may be some small mistakes, they are inconsequential enough that it is still clear that you understand the concepts we're testing.

- *Continued Learning:* this is the second time that you have demonstrated understanding of this topic!

  Note 5.1 Continued Learning will only be a relevant grade for the Main Standards.

5.4 Grade Composition

Your grade will be calculated based on your progression through the different types of standards. Below is a chart denoting how many standards need to be met from each category to earn each letter grade.

Table 5.2

	A	*B*	*C*	*D*
Main Standards (20)	19	16	13	11
Continued Learning (20)	8	4	2	0
Extra Standards (7)	5	3	1	0
Practice Problem Reflections (14)	7	7	7	0

You will end the semester with the highest letter grade for which you have met the requirements in all four categories. In other words, each column represents the minimum requirements for that letter grade.

5.5 Assessments and Assignments

Practice Problem Reflections

Practice problems for the semester will be posted on Canvas. These problems will not be graded in the traditional sense. Instead, you will be asked to work on these problems at your own pace outside of class and report on your progress in a weekly "Practice Problem Reflection" assignment. In an effort to find a balance between flexibility and encouraging effective practice and reflection, these weekly reflections will be graded based on sufficient completion.

Practice Problem Reflections will be due every week on Friday (beginning during Week 2 and ending on Week 15) and will be submitted on Canvas.

Checkups

The course will feature "checkups" throughout the semester, each testing on an approximately equal portion of the course content. Each checkup will cover specific standards, listed in the course schedule.

Since the goal is that your grade at the end of the semester reflects what you've learned throughout the whole semester, the course will have replaceable checkups through retakes. The main goal with this grading scheme is to make sure that you can find out where you are misunderstanding something or where you have yet to grow in your knowledge, and then to make sure that you have the opportunity to demonstrate that you have fixed your misunderstandings or grown in your knowledge. To realize this goal, students will be offered consistent opportunities to retake previous checkups in order to update their grade as they update their understanding of the topics

All students will work on the checkups independently unless otherwise noted. All checkups (and retakes) will be proctored in-person.

6 Graded Standards

6.1 Main Standards

M.1. *Definition of Limits.* Use the definition of a limit to interpret and approximate limits graphically and numerically.

M.2. *Computing Limits.* Evaluate limits using different analytic techniques and properties of limits.

M.3. *First Indeterminate Forms.* Evaluate limits with the indeterminate form $0/0$ using algebraic manipulations.

M.4. *Limits Involving Infinity.* Evaluate and interpret limits involving infinity: both infinite limits and limits at infinity.

M.5. *Continuity.* Define continuity and determine continuity of functions at a point, an endpoint, and on an interval. Use and interpret the Intermediate Value Theorem.

M.6. *Definition of a Derivative.* Use the limit definition of the derivative to compute derivatives and evaluate them at a point.

M.7. *Interpret Derivatives.* Interpret derivatives and connect them to slopes of tangent lines, instantaneous rates of change, or velocity of an object.

M.8. *Common Derivatives.* Differentiate and interpret "basic function types."

M.9. *Product and Quotient Rules.* Use the Product Rule and Quotient Rule to compute derivatives of functions with products and quotients of function types.

M.10. *Chain Rule.* Use the Chain Rule to compute derivatives of composite functions.

M.11. *Implicit Differentiation.* Compute the derivative of implicitly defined functions and relations, and solve related rates problems.

M.12. *Inverse Derivatives.* Compute derivatives involving inverse functions.

M.13. *Mean Value Theorem.* Describe what connection the Mean Value Theorem makes between a function and its derivative, and use it to connect instantaneous and average slopes of a function.

M.14. *Increasing/Decreasing.* Find critical points of a function, determine where the function is increasing and decreasing, and use the First and Second Derivative Tests to classify critical points as local extrema or not.

M.15. *Concavity.* Determine where the function is concave up and concave down and find any inflection points of a function.

M.16. *Absolute Extrema.* Find absolute maximums and minimums of continuous functions on either closed or open intervals (if they exist).

M.17. *Linear Approximation.* Build and use a Linear Approximation of some function to approximate a value.

M.18. *Antiderivatives and Indefinite Integrals.* Antidifferentiate "basic function types," find indefinite integrals, and solve initial value problems.

M.19. *Riemann Sums.* Use Riemann sums to approximate the area under a curve.

M.20. *Fundamental Theorem of Calculus.* Evaluate derivatives of definite integrals using the Fundamental Theorem of Calculus Part 1 and evaluate definite integrals using the Fundamental Theorem of Calculus Part 2.

6.2 Extra Standards

E.1. *Squeeze Theorem.* Evaluate limits using the Squeeze Theorem, and interpret and/or apply the theorem graphically as well as analytically.

E.2. *Precise Definition of Limits.* Build the work to construct formal proofs of limits, using the $\varepsilon - \delta$ definition or the open set definition of limits.

E.3. *Advanced Derivatives.* Evaluate derivatives of functions involving many different combinations of function types or requiring techniques like logarithmic differentiation.

E.4. *Optimization.* Set up and use derivatives to solve optimization problems.

E.5. *L'Hopital's Rule.* Use derivatives to evaluate indeterminate limits using L'Hopital's Rule.

E.6. *Definite Integral Tricks.* Use properties of definite integrals (including symmetry) to evaluate definite integrals. Find the average value of a function.

E.7. *u-Substitution.* Use substitution to find indefinite integrals and evaluate definite integrals.

7 Schedule

Note 7.1 This schedule is an outline and it may change throughout the semester. Any changes will be announced.

Table 7.2 Tentative Course Schedule

Week	Date	Agenda
Week 1:	Jan. 12	Welcome to Class!
	Jan. 14	M.1. Definitions of Limits
Week 2:	Jan. 19	*Martin L. King Day: No Class*
	Jan. 21	M.2. Computing Limits
Week 3:	Jan. 26	M.3. First Indeterminate Forms
	Jan. 28	M.4. Limits Involving Infinity
		Checkup 1: M.1, M.2, M.3
Week 4:	Feb. 2	E.1. Squeeze Theorem
		M.5. Continuity
	Feb. 4	M.5. Continuity
		E.2. Precise Definitions of Limits
Week 5:	Feb. 9	M.6. Definition of a Derivative
	Feb. 11	M.7. Interpreting Derivatives
		Checkup 2: M.4, E.1, M.5, E.2
Week 6:	Feb. 16	*Presidents' Day: No Class*
	Feb. 18	M.8. Common Derivatives
Week 7:	Feb. 23	M.8. Common Derivatives
	Feb. 25	*Checkup 3: M.6, M.7, M8*
		Retakes for Checkups 1-2
Week 8:	Mar. 2	M.9. Product and Quotient Rules
	Mar. 4	M.10. Chain Rule
	Mar. 9-15	*Spring Break: No Class*
Week 9:	Mar. 16	M.11. Implicit Differentiation
	Mar. 18	M.12. Inverse Derivatives
Week 10:	Mar. 23	E.3. Advanced Derivatives
		M.13. Mean Value Theorem
	Mar. 25	M.14. Increasing/Decreasing
		Checkup 4: M.9, M.10, M.11, M.12, E.3
Week 11:	Mar. 30	M.15. Concavity
		M.16. Absolute Extrema
	Apr. 1	M.16. Absolute Extrema
		E.4. Optimization
Week 12:	Apr. 6	M.17. Linear Approximation
		E.5. L'Hopital's Rule
	Apr. 8	*Checkup 5: M.13, M.14, M.15, M.16, E.4*
		Retakes for Checkups 3-4
Week 13:	Apr. 13	M.18. Antiderivatives and Indefinite Integrals
	Apr. 15	M.19. Riemann Sums
Week 14:	Apr. 20	M.20. Fundamental Theorem of Calculus
	Apr. 22	E.6. Definite Integral Tricks
		Checkup 6: M.17, E.5, M.18, M.19
Week 15:	Apr. 27	E.7. u-Substitution
	Apr. 29	*Checkup 7: M.18, M.20, E.6, E.7*
		Retakes for Checkups 5-6
Week 16:	May 4	*Final Exam (Part 1)*
	May 6	*Final Exam (Part 2)*

Weekly *Practice Problem Reflection* assignments are due on Friday of every week starting in Week 2 and ending in Week 15. They can be submitted on Canvas.