MATH 0220-1500 **Analytic Geometry & Calculus 1** **Fall 2025**

Instructor: Edison Hauptman (he/him/his) **Contact Me:** ERH129@pitt.edu

My Drop-In Hours: TBD, 4 per week

Prerequisite: Minimum math placement score of 76 or Math 0200 with minimum grade of C.

Textbook: James Stewart, Essential Calculus, Early Transcendentals, Second edition.

Meeting Times

- **Lecture:** Tuesday/Thursday 8:00am-9:15am, Benedum Hall G29
- **Recitation:** Monday 9:00am-9:50am, check your TA's Canvas page
- **Lab:** Wednesday 9:00am-9:50am, Posvar Hall 1200A

Drop-In Hours

Are you having trouble understanding an example in the book? Would you like a place to study with your peers, where you can ask questions if you get stuck? Have you discovered something cool that you want to show me? Drop-In Hours are a great way to chat with me or your TA outside of class! All graduate instructors and TAs at Pitt will have Drop-In Hours in the Math Assistance Center (MAC) or their office every week, but you can also stop by the MAC whenever you are free!

Drop-In Hours are also a great place to find study partners! Working with classmates on this material will help you learn it faster and better. You won't have the exact same view on the course as your partners, so you'll be able to help one another fill in the gaps and advance everyone's knowledge together!

What is Calculus?

I think of Calculus as the math that answers two big questions. Take a minute to ponder each of these:

1. **The "Instantaneous" Rate of Change Paradox**: It is intuitive to think of velocity as the distance covered divided by the time it took to travel that distance. But it always takes some small amount of time to travel any distance, so how can we describe the *current* velocity of anything?
2. **The Area Problem**: We have formulas to calculate the area of simple shapes like rectangles and triangles. Is it possible to calculate the areas of more complicated shapes?

As we will discover, the tools developed to solve these questions are closely related to each other. They have also been applied to every branch of science, and in this course, we will lay the foundation to solve both!

To accomplish this, we will use techniques from Algebra, Geometry, Trigonometry, and more. However, your TA and I cannot spend lecture or recitation time reviewing these past tools. If you find yourself getting stuck on this background material, you should work to improve those skills *as soon as possible*! I am happy to use Drop-In Hours to help review these, and I will never demean you for not knowing something "basic" or "easy".

Friendly reminder: Math is hard, but YOU CAN DO IT! Some of you may think that you are not "math people." However, the vast majority of the world's population will never study calculus, and a little over 300 years ago, no one knew how to do any of this! Like it or not, if you are enrolled in this course, then you *are* "math people," and you belong here even if you don't feel fully prepared! Every single mathematician I know has struggled with math and *currently* struggles with math, because math is very hard! It will take consistent hard work to succeed in this course, but I promise you that you can! Speaking of which...

How can I succeed in this course?

Personally, I don't put much stock in grades. My main objective as your instructor is that you learn this material well enough to use it later in your life, wherever you happen to end up! If you can build a solid foundation with the derivative and the integral—the two tools I alluded to earlier—then you can develop a new lens through which you view the world. *(That might sound a bit pretentious, but I'm not kidding!)*

I also want to show you that there is so much more to math besides the memorization and pattern-matching that it's often known for. So in this course, you're going to get the opportunity to flex different mathematical muscles, such as communicating your results, resilience, creativity, and teamwork. These are all skills I use *every day* as an aspiring mathematician!

Sadly, there are other people in our lives who *do* care about your grades. So, to appease those folks, I will report your grade based on how well you do three things:

1. Master the **Big Ideas** of differential calculus (that's the fancy name for Calculus 1),

2. Achieve the associated **Learning Outcomes** for each Big Idea, and

3. Earn **Engagement Points** by doing assignments that will help *you* gain something from this material!

I will be measuring your *progress* throughout the semester. There won't be a big midterm that "mathematically eliminates" you from earning a B if you do poorly. Instead, you will have many chances to show me that you have *improved* your understanding of the course material, and whenever you do, that will be reflected in your grade! Let's see what that means:

1. Mastering the Big Ideas

Every week, we will have Progress Checks on 1 or 2 **Big Ideas**. Most Progress Checks will occur in your weekly lab session. The schedule for all Progress Checks will be posted on Canvas.

To master a Big Idea, you must answer at least 3 of its 4 questions correctly. You will have three attempts to master each Big Idea:

1st: Soon after I cover the material in lecture.

2nd: One week later, after you have feedback from your first attempt.

3rd: In the last week before finals week.

Once you master a Big Idea, you do not need to master it again!

2. Achieving the Learning Outcomes

Each Big Idea consists of 2-4 **Learning Outcomes** (for a complete list, see pages 7-8). When you master a Big Idea, you will immediately also achieve each Learning Outcome where *every answer is correct.* If you would like to achieve an additional Learning Outcome on a later Progress Check, you must **master the same Big Idea again**, with correct answers in the Learning Outcome you haven't achieved yet.

Note: **Whenever I say "correct answer," I really mean "essentially correct."** If you make a meaningless sign error or algebra error, but the rest of your work is sound, that's good enough for me! In other words, if you would have only lost a point or two on a traditional exam question, you will be marked "essentially correct". What I really care about in these Progress Checks is whether you understand the main ideas in each question. Whenever it's important enough to give a perfect answer, you'll be able to double-check your notes.

Example: Big Ideas and Learning Outcomes

Let's look at **Big Idea 4**, which has two Learning Outcomes (**D7** and **A1**; see the appendix):

- On Alice's first attempt, she answers the two D7 questions correctly, along with one of the two A1 questions. Since Alice has 3 questions correct, she has mastered **Big Idea 4** and achieved Learning Outcome **D7**.
- On Alice's second attempt, she answers the two A1 questions correctly, but not the two D7 questions. Since Alice has only 2 questions correct, she has not achieved another Learning Outcome. However, her previous mastery of **Big Idea 4** and achievement of Learning Outcome **D7** are not affected.
- On Bob's first attempt, he answers the two **D7** questions correctly, but not the two **A1** questions. Since Bob only has 2 questions correct, he has not mastered the Big Idea, and therefore, he has not achieved any of the Learning Outcomes yet.

3. Earning Engagement Points

Besides the weekly Progress Checks, there are many other assignments in this course which will earn you **Engagement Points**. **I do not expect you to complete *all* of these assignments.** You should choose the assignments that will help you with your own learning, and focus on those!

Calculus Readiness Bootcamp (20 pts): For extra practice with Algebra, Trigonomtry, and Precalculus, you can complete a free resource offered by our textbook publisher, Cengage. See Canvas for more information.

Extra Learning Outcomes (20 pts each): I'll count each Learning Outcome you achieve *above* a given grade threshold as 20 bonus Engagement Points, in whatever way gives you the highest grade.

Final Exam (200 pts): Pitt's math department stipulates that all students in day sections of Calculus must take a common final exam during Final Exam Week. The exam will be designed by the course coordinator, with some input from all Calculus 1 professors. The final exam is scheduled for **Thursday, December 11th, at 8am**.

LON-CAPA Problem Sets (150 pts): LON-CAPA is the computer system where you will complete online homework. Each of you will have different randomly-generated numbers, but the problems are the same across all Calculus 1 courses. LON-CAPA can be accessed through my.pitt.edu or Canvas. In most weeks, a problem set will be due on Monday night at 11:59pm.

If you want to access LON-CAPA off campus, you must download Global Protect, which is a Virtual Private Network (VPN). Your TA will show you how to set up LON-CAPA and Global Protect in your first lab session. If you have any trouble using LON-CAPA, let me or your TA know!

Practice Problem Sets (5 pts each, 1/week): For each section we cover, there are recommended textbook problems. If you submit solutions to a few of these in a given week (check Canvas for how many), you will earn 5 points. There are many outside resources with practice problems too; you may use these with prior approval.

Top Hat Tally (∼60 pts): In most lectures, I will ask a few quick questions which you can respond to anonymously using the Top Hat app, for 1 point per response. Active engagement in the lecture will be more difficult than passively listening to me, but it's better for your learning!

Recitation Check In's (5 pts each, 1/week): In the first five minutes of each recitation, your TA will have you reflect on the course material with a partner. This will give you a chance to think about your progress in the course and prepare questions for your TA.

A New Perspective (20 pts each): The Calculus 1 course at Pitt typically has a wide diversity of students across majors and mathematical backgrounds. Therefore, for any topic your TA or I may cover in class, you may have a different example or explanation that helps you or a classmate understand it better. If you want to discuss one of these with me or your TA in some detail (ideally in Drop-In Hours), we can give your points for your independent exploration and thought!

Group Excursions (20 pts each, ~4-6 total): My lectures will often give a broad overview of the course material, and your TA's recitations will often focus on problem-solving strategies. The Group Excursions will be a change of pace, where you will work in small teams and take a deeper dive into a specific part of Calculus.

In my opinion, this assignment is the soul of this course! In Pitt's math department, Calculus 1 is a highly structured and coordinated course, and we do not have the full freedom to explore this subject however we wish. **In these Group Excursions, we get to take some steps off the beaten path, and I want *you* to choose where we go!** I would be happy to explore any topic in our curriculum (or anything *just* outside of it) in greater detail, so you should let me and your TA know what you're interested in! Group Excursions may occur in lectures or recitations, and I'd like for us to complete 4-6 of them.

Typical Weekly Schedule

Here is an outline of all the regularly-occurring events and assignments in this course:

Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
	Lecture at 8am (*Top Hat Tally*)	Practice Problem Sets (*due at 9am*)	Lecture at 8am (*Top Hat Tally*)	
Recitation at 9am (*Recitation Check In*)		Lab at 9am (*1-2 Progress Checks*)		
LON-CAPA (*due at 11:59pm*)				

Final Grade

In order to earn a given letter grade, you must satisfy **all** of the requirements in the corresponding row.

Final Grade	Big Ideas Mastered (/9)	Learning Outcomes Achieved (/26)	Engagement Points Earned
A+ (4.0)	9	22	550
A (4.0)	9	22	500
A-	8	21	500
B+	8	20	450
B	8	19	450
B-	7	18	450
C+	7	18	400
C	7	17	400
C-	6	16	400
D+	6	16	350
D	6	15	350
D-	5	14	350
F	Did not meet all of the requirements for a D-		

Other Course Policies

Canvas: Most of this course, including announcements, resources, due dates, and assignments, will be on our lecture's Canvas page. You are responsible for checking Canvas often. Your TA may have additional information on your recitation's Canvas page as well. You will also be able to see scores for all assignments on Canvas. However, Canvas is not compatible with this course's grading system, so **your overall grade will *never* appear on Canvas!**

Keeping Track of Your Grade: I will hand out a colored sheet of paper on the first day of class (see page 9). You may also want to track your progress digitally—if so, you can download and fill out a Microsoft Excel spreadsheet which is based on my own grade tracker. Copies of both of these sheets will be on our Canvas page.

If you have never taken a course like this one before, then this grading system may feel intimidating or complicated. That's okay! **Just like Calculus, if this grading system new to you, then it will take some time to learn, and I don't expect you to understand it immediately!** Throughout the term, I will dedicate class time to discussing the grading system, but please don't hesitate to ask me or your TA any questions!

If you are ever worried about your grade in this course, please reach out earlier than you think you need to. I am happy to help you make a plan!

Absent from Class: If you miss a class meeting, whether excused or not, you are responsible for using the resources available to you (your peers, Drop-In Hours, the textbook, etc.) to ensure you do not fall behind on the material. If you are absent for an extended period of time, or if you miss the final exam day, please keep me in the loop. I am willing to work with you!

Make-up/Late Assignments: Since you will have three attempts at each Big Idea in this course, **you will not be able to make up missed Progress Checks**. The only assignment that can be made up or submitted late are the Practice Problem Sets (up to 24 hours). There is a lot of flexibility in this course because I know some things will go wrong. Please take care of yourself and use the flexibility in this course to your advantage!

Textbook: You were automatically opted in to receive an electronic version of the textbook through our Canvas page. If you do not want an electronic copy, you *must* opt out early in the term. You will receive an email with the subject line, "Access your MATH 0220-19315 Materials," which will have more information on this. **Note that the course textbook is *not* required to complete any assignment in this class**.

Calculators: Calculators are not permitted on exams or Progress Checks (and are not very useful in most of our assignments), but you may benefit from having a scientific calculator handy for some parts of the course. Unless I specifically tell you to do so, you will not have to simplify your answers on Progress Checks or exams!

Academic Integrity and External Resources: For our purposes, you may consider "cheating" to be any action that could give you an unfair advantage on a Progress Check or exam, and you may consider "plagiarism" to be any presentation of work as produced by you when it was not. **Neither of these are acceptable in a college course.**

You are likely familiar with Large Language Models such as ChatGPT. When calculators were invented, they did not make math obsolete, and the same will be true of LLMs. [In fact, it is my own knowledge of Calculus that informs me that LLMs do not actually *know* anything, and therefore they should never be trusted to make decisions!]

You should never copy solutions from an LLM or anywhere else for *any* assignment in this course—that's plagiarizing! It is fine with me if you are using external resources to study or practice. Just remember that math is not a spectator sport, and understanding someone else's explanation is only half the battle. The only way to achieve the Learning Outcomes in this course is if you build your own understanding.

Also, there is flexibility and leniency built into this grading structure specifically so you can succeed! If you find yourself in a place where you're considering cheating or plagiarism, please talk to me or your TA instead, and let us help you find a fair way to succeed in this course.

Equity, Diversity, and Inclusion: I have designed this course with the recognition that you all have different opinions about, background knowledge of, and strengths in math. Your diversity of perspectives, intersected with your disability status, race, color, religion, national origin, ancestry, genetic information, marital status, familial status, sex, age, sexual orientation, veteran status, gender identity, etc., can make this course more enriching for all of us. I strive to make my class a space that is respectful, welcoming, and inclusive of every member of the class, and you are expected to contribute to this!

If you or someone else does not feel respected, welcomed, or included in this class, and you are not comfortable talking to me first, you can reach out to Pitt's Title IX Coordinator by calling 412-648-7860, or emailing titleixcoordinator@pitt.edu. Reports can also be filed online. If you wish to maintain complete confidentiality, you may also contact the University Counseling Center (412-648-7930).

Disability Resource Services: If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact me *and* Disability Resources and Services (DRS), 140 William Pitt Union (412) 648-7890, drerecp@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course. As with all other things in this course, proactive communication is key!

I wish you all a wonderful semester!

Appendix: List of Big Ideas and Learning Outcomes (Textbook Sections)

1. **Limits and Continuity**
   - **L1** I can compute the limit of a function at a point using its graph. (1.3)
   - **L2** I can compute the limit of a function at a point using algebraic techniques. (1.4)
   - **L3** I can use the definition of continuity to determine whether functions are continuous. If a function is not continuous, I can identify the type of discontinuity. (1.5)
   - **L4** I can determine the end behavior of functions by computing limits “at” infinity. (1.6)
2. **Definition of the Derivative**
   - **L5** I can use the limit definition of the derivative to compute derivatives of simple functions. (2.1)
   - **D1** I can determine where a function is differentiable using the limit definition of the derivative or the graph of the function. (2.2)
   - **D2** I can find the equation of the tangent line to a graph at a given point. (2.2)
3. **Derivative Rules**
   - **D3** I can use the power rule to compute derivatives of algebraic functions (polynomials and roots). (2.3)
   - **D4** I can use derivatives of sine and cosine functions to compute derivatives of other trig functions. (2.3)
   - **D5** I can compute derivatives of products or quotients of two or more functions. (2.4)
   - **D6** I can compute derivatives of nested functions using the chain rule. (2.5)
4. **Related Rates of Change**
   - **D7** I can compute the equation of a tangent line to an implicit curve. (2.6)
   - **A1** I can use implicit differentiation to compute related rates of change in model problems. (2.7)
5. **Exponentials, Logarithms, and Inverses**
   - **D8** I can compute derivatives of exponential and logarithmic functions. (3.1-3.3)
   - **D9** I can use logarithm rules to compute derivatives efficiently. (3.1-3.3)
   - **D10** I can compute derivatives involving inverse trig functions using implicit differentiation. (3.5)
6. **Shape of Graphs**
   - **A2** I can use information about the first derivative of a function to determine where it is increasing or decreasing. (4.2-4.3)
   - **A3** I can use information about the second derivative of a function to determine whether it is concave up or concave down. (4.2-4.3)
   - **A4** I can calculate limits using L’Hospital’s Rule. (3.7)
   - **A5** I can approximately graph any function using information about its intercepts, asymptotes, and first and second derivatives. (4.4)

7. Optimization

- **A6** I can use the first and second derivatives of a function to identify its local and global maximia/minima on a given domain. (4.1)
- **A7** I can find optimal solutions to model problems using single-variable derivatives. (4.5)

8. The Integral as Area

- **I1** I can use Riemann sums to approximate the area underneath a curve. (5.1)
- **I2** I can compute exact values of definite integrals using properties of area. (5.2-5.3)

9. The Fundamental Theorem of Calculus

- **I3** I can use antiderivative formulas to compute antiderivatives of functions. (4.7)
- **I4** I can compute derivatives and integrals using the Fundamental Theorem of Calculus. (5.3-5.4)

Bonus: Integration Techniques*

- **I5*** I can use the u-substitution technique to compute relevant integrals. (5.5)
- **I6*** I can use the integration by parts technique to compute relevant integrals. (6.1)
- **I7*** I can compute integrals of products of trig functions using trig identities and u-substitution. (6.2)

*Since we will learn integration techniques very late in the semester, there will only be two Progress Checks where you can master this Big Idea and achieve the corresponding Learning Outcomes. So, while there are technically 10 Big Ideas and 29 Learning Outcomes in total, you are only officially responsible for 9 Big Ideas and 26 Learning Outcomes.

You can find a complete schedule with dates for all Progress Checks on Canvas.

Appendix: Final Grade Tracker

Big Ideas	Learning Outcomes			
☐ BI 1	☐ L1	☐ L2	☐ L3	☐ L4
☐ BI 2	☐ L5	☐ D1	☐ D2	
☐ BI 3	☐ D3	☐ D4	☐ D5	☐ D6
☐ BI 4	☐ D7	☐ A1		
☐ BI 5	☐ D8	☐ D9	☐ D10	
☐ BI 6	☐ A2	☐ A3	☐ A4	☐ A5
☐ BI 7	☐ A6	☐ A7		
☐ BI 8	☐ I1	☐ I2		
☐ BI 9	☐ I3	☐ I4		
☐ BI B	☐ I5	☐ I6	☐ I7	

Total Big Ideas:

1	2	3	4	5	6	7	8	9	10

Total Learning Outcomes:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	

Total Engagement Points:

Calculus Readiness Bootcamp (20) ☐

LON-CAPA Problem Sets (150) _____

Top Hat Tally (∼60) _____

A New Perspective (20 each) ☐☐☐x20=_____

Group Excursions (20 each) ____+____+____+____+____+____=_____

Practice Problem Sets (∼60) ☐☐☐☐☐☐☐☐☐☐☐☐☐x5=_____

Recitation Check In's (∼60) ☐☐☐☐☐☐☐☐☐☐☐☐☐x5=_____

Final Exam (200) _____

Extra LOs (20 each) _____

Bonuses ____________________

Total _____

Final Grade	Big Ideas Mastered (/9)	Learning Outcomes Achieved (/26)	Engagement Points Earned
A+ (4.0)	9	22	550
A (4.0)	9	22	500
A-	8	21	500
B+	8	20	450
B	8	19	450
B-	7	18	450
C+	7	18	400
C	7	17	400
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