

Calculus 1 - Differentiation

Math 2210, Section 12, Fall 2022 Syllabus

Welcome to Calculus 1 - Differentiation!

This course develops differentiation of functions in one variable with an emphasis on conceptual understanding, problem solving, multidisciplinary applications, and use of technology. Activities will be centered around opportunities for us to practice explaining, visualizing, justifying, computing, modeling, and interpreting. We will explore problems that cover diverse applications such as motion and speed of objects, linear dimensions and volume, sale prices and investment growth, population growth, daily temperature, and more.

Course Information

Instructor:	Zadock Reid, Ph. D.
Office location:	JB 530
Email:	zreid@csusb.edu
Office hours:	By Appointment
Office hour link:	https://csusb.zoom.us/j/84692322899
Class days/time:	Tuesday, Thursday, Friday 2:00 PM – 3:45 PM
Class link:	https://csusb.zoom.us/j/84692322899
Classroom:	PL 263

Communication

Clear and efficient communication is essential this term. To this end, I will use Canvas and Email to send out messages.

- **Canvas.** Materials for the course and links to relevant sites will be provided for you on Canvas. To access our Canvas course, go to csusb.instructure.com (or go to MyCoyote>Canvas) and click on your Math 2210 course link. *You should be sure to check into the Canvas course at least a couple of times a week and check Announcements for any course updates.*

Email. Regularly check your university emails as I and the University will often send you important messages through email. When sending me an email, make sure to write

“Math 2210” in the subject line so your email will stand out in the queue.

Prerequisites

Semester Prerequisite: MATH 1401 or satisfactory score on department placement exam. Quarter Prerequisite: Satisfactory score on the Entry Level Mathematics examination or passage of MATH 120

Course Content Overview

Differentiation of functions in one variable with an emphasis on conceptual understanding, problem solving, multidisciplinary applications, and use of technology for numerical methods and graphical representation. Topics will include limits, continuity, derivatives, modeling, optimization, and related rates. Additional topics may include definite and indefinite integrals and basic techniques of integration.

Mathematics is *more* than computation. It is meaning making, explaining, interpreting, justifying, problem solving and so much more. In this course, you will not only learn about differentiation, but practice and develop this essential mathematical actions.

Course Goals/Objectives and Student Learning Objectives/Outcomes

Math 2210 is a general education (GE) course and is designated GE Category B4. This means we have the following GE student learning outcomes (GLOs):

1. **Learning How to Learn/Metacognition.** Develop awareness of their learning processes, becoming reflective, self-directed learners who are able to apply and adapt their processes of learning in new contexts.
2. **Critical Literacy - (Quantitative Reasoning and Technological Literacy).** Analyze the ways that quantitative and technological information both shape and are shaped by social contexts.

As a course in the math department, we have the following Program Student Learning Outcomes (PLOs). Upon successful completion of this course, you will:

- 1.1. Demonstrate an understanding of fundamental concepts, algorithms, operations, and relations
- 1.2. Make connections between mathematical ideas verbally, numerically, analytically, visually, and graphically.
- 2.1. Correctly apply mathematical theorems, properties and definitions.
- 3.1. Justify solutions using a variety of strategies and representations.

Textbook

The required textbook is [*Calculus: Single Variable, 8th ed. by Hughes-Hallet et al.*](#) ISBN: 978-1-119-78384-8

Math 2210 is part of the [Inclusive Access \(IA\) Program](#), which is a collaboration between the publisher Wiley and the bookstore, and allows you to access the digital textbook *immediately* via [WileyPlus](#). You may opt out of IA any time before census. If you remain in IA, at that time you will be charged \$48. This price is for 1 term of WileyPlus access.

Your responsibilities

1. Attend all synchronous class sessions and contribute to class discussions in whole-group and small-group formats
2. If you must miss a session, you are still responsible for all material covered in that session and for all announcements made therein. Ask a classmate to take notes for you in case of absence.
3. Check Canvas before each class meeting for any announcements or course materials.
4. For each session, be prepared with:
 - a. Your Calculus text
 - b. Notebook with paper, graph paper, pencils, erasers, etc
 - c. A graphing utility, preferably Desmos or GeoGebra
5. Try the homework as soon as it is assigned. Ask questions during the next class so that you can finish your homework on time.
6. Visit office hours or arrange another time to obtain additional support.

What constitutes “class participation”?

This class will meet synchronously three times per week, for one hour and fifteen minutes. We will need to: (a) be very efficient in use of the time, and (b) remember that much of the course work takes place outside of class. Appropriate participation involves:

- Being prompt in joining any synchronous sessions ready to work immediately,
- Being active in small-group and whole-class discussions in class and in discussion boards
- Collaborating with your class-mates in outside-of-class activities, including online discussions and in-person collaboration (where appropriate), and
- Completing assignments on time and thoroughly.

How much time should I expect to spend on this class?

Per the University Catalog, students are expected to complete a minimum 2 hours of homework for every hour of classwork. As this is a 4 credit hour course, I expect you to work a minimum of 8 hours per week outside of class. Please make sure you schedule this time into your week! If you are unable to structure your schedule accordingly, you put yourself at a high risk of falling behind, which can have serious consequences.

Extra Help

I love talking about math, and I am more than happy to help you develop your full potential. Please feel free to ask questions during, before, or after class. Every question is a good question! I am also available through email and I have office hours by appointment. Working with peers can both help clear up any possible confusion and provide perspectives that may help you see connections and deepen your understanding of the content. Here are some ways in which you are encouraged to support your studies:

- Join/form a study group
- Stop by my (Zoom) office hours or make an appointment for a different time
- “Visit” the [Math Gym](#).
- “Visit” [LSAMP Workshops](#).

Commitments to Inclusion, Equity, and Social Justice

CSUSB aspires to be a model for transforming lives. This is manifest in our [Core Values](#). Throughout the syllabus you will read a number of comments regarding creating a positive and productive class culture; these are meant to support our values of inclusion:

“We affirm and are committed to the value of all kinds of differences among students, faculty and staff. Inclusivity that is broad and deep makes us a healthier and more productive organization and builds a culture that fosters engagement and diverse perspectives,”

and equity and social justice:

“We believe in, affirm, and are committed to the equal value and dignity of all people. Fairness and equity are more than equality. We actively seek to eliminate barriers for those who are disadvantaged and disempowered so they may participate fully in university life.”

COVID Information and Protocols

We will work together to make our classroom a safe space.

Please keep in mind that we are all in uncharted territory together. We are trying our best to balance best practices for teaching and best practices for COVID safety. We will need to be flexible and patient as we adjust the course throughout the term to our ever changing situation.

Check Canvas / Email announcements before every class in case.

Classroom Safety

Students, Faculty and Staff are subject to the [Interim COVID-19 Vaccination Policy](#). Beginning Monday, August 15 and continuing through Friday, September 16, 2022 face coverings will be required to be worn when indoors on campus. Those experiencing symptoms of COVID-19 should not report to campus and should follow normal absence reporting procedures

Those without will be asked to return upon obtaining one. Limited exceptions can be obtained by contacting the Office of Services for Students with Disabilities. Students unwilling to wear a mask will be asked to leave immediately and appropriate security protocol (including class cancellation) may occur at the discretion of the faculty, who may then assign additional work due to non-compliance.

COVID protocols are subject to change depending on appropriate guidance from the California Department of Public Health, local County public health departments, or COVID prevalence in the region.

For additional details please check the [Return of the Pack website](#).

COVID Attendance Policy

When we return to campus, this class will be taught in a Next-Generation Smart Classroom, upgraded with cameras, microphones, and other equipment to enhance remote teaching and learning. If you can't attend class in person due to illness, child care, parent care, or other reasonable grounds which need to be approved by me, please observe the class meeting via Zoom during the scheduled class time, using the link found under Zoom in the Canvas course site. Please, note that I will take attendance at every class meeting and tally both on-site and remote students. Remote students are encouraged to engage fully with all class lectures and activities ---- attend from a quiet location and free of distractions, and devote their full attention to class during the scheduled time. Remote students are also encouraged to keep their webcams on throughout lectures (but to mute their audio unless speaking) and submit questions via Zoom chat.

Your learning is centered around group work. You will get the best experience if you come to class. If you are healthy and able, you should always attend. Recordings will be made of lecture and class discussion (not group work) and posted to Canvas. These technologies enable us to remain flexible and to maintain our classroom as a safespace.

What Happens If...

1. If you feel [any symptoms](#) before coming to class that could be a sign of COVID infection, stay home. From your home, log into the Zoom meeting and attend remotely.
2. If you have been in [close contact](#) with someone who has tested positive for COVID, then stay home for the CDC recommended time of [quarantine](#). From your home, you may then log into the Zoom meeting and attend remotely.
3. If you have tested positive for COVID and do not feel too sick, then stay home and log into the Zoom meeting and attend remotely.
4. If you have tested positive for COVID and feel very ill, then stay home, rest, focus on recovering. Regularly message me with your status and when you are feeling better, you can watch the classroom recordings to catch up. If you fall very behind, message me and we can discuss your options.
5. If the whole class must quarantine or the university goes entirely remote, then class will be entirely remote via our Zoom room.

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6. If I cannot come to class due to COVID but still feel reasonably well, then class will be entirely remote via our Zoom room.
 7. If I cannot come to class due to COVID and feel very ill, then I will try to find a replacement instructor, but if I cannot, class will be cancelled.

Assessment Overview

In this course, you have multiple types of assessment, as outlined in the table below.

Assessment	Percent
Attendance and Participation	10
WeBWorK homework (by section)	20
Written homework (weekly)	20
Gateway Masteries (2)	5 (2.5 each)
Quizzes (weekly)	15
Midterms (2)	20 (10 each)
Common Final	10
Total	100

- Grading is not competitive - so please share your knowledge and thoughts with your classmates in class and out!
- Most of your homework will be submitted via WeBWorK.
- Written homework will be submitted via email or Canvas depending on the assignment. Form of submission will be discussed for each assignment prior to or at the time it is given.
- All mathematical content will be graded both on mathematical correctness and on clarity of exposition. Some assignments may have rubrics posted on Canvas, please use these to support self-assessment before submission.

Final Course Grade

Your course grade will correspond to the appropriate percent in the table below. No “extra credit” will be awarded, since extra credit is built into the table itself. You’ll need to submit work regularly throughout the quarter. If you procrastinate, you may miss key deadlines. Late work is not accepted.

Percent	Grade	Percent	Grade	Percent	Grade
95-100%	A	83-86%	B	73-76%	C

90-94%	A-	80-82%	B-	70-72%	C-
87-89%	B+	77-79%	C+	<70%	NC

Online Homework (WeBWork)

Sufficient experience with problem solving is crucial for success in this class. Online homework will be assigned for each section covered in class. Online homework will be assigned on [WeBWork](#). If you are enrolled in the class, you will be able to sign in with your CoyoteID and password.

I expect you to read the [WeBWork documentation](#) and watch the associated video.

Why? WeBWork is an excellent system for letting you practice procedural skills, and Rule of 4 reasoning. Furthermore, you get instantaneous feedback. One deficiency is that it does not allow you to practice carefully explaining your thinking and interpreting results. That is where your written work comes in.

Written Homework

Each week you will be assigned written homework in which you are to write up carefully solutions to certain problems, which are to be submitted through [Canvas/Gradescope](#). You must ensure that assignments are submitted as a pdf. It will be graded and returned to you with feedback. **You may redo, addressing all feedback, and resubmit it, to earn back any missed points.**

Why? It is essential to give opportunities to practice, get feedback on, and refine the activities of modeling, explaining, justifying and other critical mathematical actions.

I encourage you to type up your written assignments and they are to be formatted appropriately. Some possible word processors:

- a. Google Docs (permanently free to all, and easy to use for collaboration)
- b. [Open Office](#) (permanently free to all)
- c. [Microsoft Office 365](#) (free for CSUSB students and employees)
- d. LaTeX (a free mathematical typesetting language)

Late homework will not be accepted, since much of it is preparatory for class, and therefore required to support your learning in the following class.

You are encouraged to make use of Grammar and Spell checkers, such as those available within Google Docs, Open Office, MS Word, or an online tool like [Grammarly](#). Regarding citations, you may use any style (e.g. Chicago, MLA, APA, etc.) as long as you are consistent in applying that style and you always include all the information needed to find the source cited. Explore the Zotero app (the library has workshops)–Zotero will format citations for you!

When submitting typed work, mathematics must be typed using appropriate mathematics formatting. All of the word processing tools listed in the previous paragraph are equipped with mathematics formatting tools, and the article "[Don't just do the math - type it!](#)" provides some typing tips as well as some reasons why this is important for you.

I am happy to review with you any questions or problems that you like. Please either come to office hours or set up an appointment at another time if you are unable to come to office hours.

Attendance and Participation

It is critical that you attend every class session¹. Your success in this class is dependent on active participation in all lecture and collaborative work. Bring your textbook to class and record your thinking and solutions to problems that are assigned and worked during class. Homework will be conceptually similar to problems worked in class, so it will be helpful to review your class notes before beginning your homework. You receive participation points during each class session for completing the in-class activities and participating productively in class discussions.

This class relies strongly on a collaborative approach to learning. To reflect the importance of collaboration, 10% of the available points are given for participation. This will be judged by the quality and quantity of your participation both in class and online via Slack.

If missing a class session is unavoidable, it is your responsibility to find out what you missed and arrange to do the work on your own before the next class period. More than two absences will result in an overall grade reduction of 2 percentage points per class missed. Persistent tardiness and early departures will count as absences as well.

Quizzes

Quizzes will be once a week in class and cover the material from the previous few days of class. You will be allowed to use a writing utensil and nothing else unless told explicitly otherwise.

Midterm Exams

There will be two midterm exams in person in class. You will be allowed a writing utensil, a graphing utility, and 3x5 notecard in which you can put any information you wish. Nothing else will be allowed unless told otherwise.

¹ See COVID Information and Protocols Section for clarification.

Common Final Exam

The common final exam is cumulative and must be taken in person on the Saturday of final week from 9-11am. This term, that is [December 10th](#). You will be allowed a writing utensil, a graphing utility, and 3x5 notecard in which you can put any information you wish. Nothing else will be allowed unless told otherwise. You will need to bring your student ID and display it when turning in your exam. The room will be assigned and distributed later in the term.

Make appropriate plans now to attend the final. That means arrange your work schedules, travel arrangements, and family obligations now. Special accommodations require documentation and must be provided to me as soon as possible.

The final will be cumulative and is a summative assessment designed to reflect your ability to use differential calculus to model real-world situations, and use those models to explain, interpret, justify, and predict outcomes. The Rule of 4 will be central. You may view old common finals at the following link: [Old Final Exams](#).

Gateway Masteries

Procedural fluency with algebra (1.1-1.6) and differentiation (3.1-3.6) is essential for success in the course (and most applications of calculus). Gateways of this nature have been shown to be a highly effective, flexible, and lower-stress means for helping you achieve these important masteries.

Practice. You can take the *practice gateway* on WeBWork as many times as you want. We encourage you to take that over and over until you are consistently getting perfect scores. Then, when you are ready, go take the proctored gateway.

What you can use. Just a writing utensil and blank scratch paper. Nothing else.

Location. The proctored gateways can be taken at the testing center in University Hall (UH-347). The testing center hours are 9am-4:30pm. (Note: Location of the testing center may move, so check in for updates once they open.)

Frequency. You can take the proctored gateway (on WeBWork) as many times as you want during testing center hours.

Topics.

- Weeks 2-3 - Algebra (10 questions)
Covering algebraic simplification, fractions, exponents, logarithms, and trigonometry.
- Weeks 9-10 - Differentiation (7 questions)
Covering elementary function rules (power, exponent, trig, etc) and decomposition rules (sum, product, quotient, chain, and inverse)

Mastery. You need to achieve mastery of each. To have mastered the skill, you will need to take the gateway and miss no more than 1 question on it.

Do not wait until the last minute. Each of you can achieve mastery if you practice and do not wait until the last minute.

Intellectual Honesty

The University has strict guidelines regarding the issues of plagiarism and cheating. Plagiarism and cheating are violations of the [Standards for Student Conduct](#) (Title 5, §41301, California Code of Regulations). Plagiarism is the act of presenting the ideas and writing of another as one's own. Cheating is the act of obtaining or attempting to obtain credit for academic work through the use of any dishonest, deceptive, or fraudulent means.

I take intellectual honesty very seriously. Students guilty of plagiarism or cheating will incur the following penalties:

- First offense on homework or quiz: Entire assignment will receive a 0 and the incident will be reported to the [Office of Student Conduct and Ethical Development](#).
- Second offense on homework or quiz: Student will fail the course and incident will be reported to the [Office of Student Conduct and Ethical Development](#).
- Cheating on an exam: Student will earn a NC in the course, and incident will be reported to the [Office of Student Conduct and Ethical Development](#).

Using the internet to find solutions is strongly discouraged. The only way to learn the material deeply is to work thoughtfully and engage your brain by doing mathematics. Reading someone else's work (even if you understand it item by item) gives a false impression of true understanding, and does not translate well to exams or to applying the content to future courses. You are certainly encouraged to work with classmates - but once the collaboration is done, make sure you understand and are submitting your own work by writing up a solution from scratch by yourself and in your own words. If you use outside resources, you must give credit, and preferably also explain how you used the resource. You may or may not receive full credit for the assignment (depending on how much of the work is your own), but is surely better than submitting dishonest work (and incurring the penalty involved)!

University Policies

In Case of Emergencies

Please refer to the [Office of Emergency Management and Business Continuity](#) for information regarding emergency management and safety guidelines.

Plagiarism and Cheating

Students are expected to be familiar with the University's Policy on cheating and plagiarism. Please review this in the "[Academic Regulations](#)" section of the CSUSB Bulletin. Plagiarism and cheating are violations of the Standards for Student Conduct (Title 5, §41301, California Code of Regulations). Definitions and procedures for addressing cheating and plagiarism are found in the Faculty Senate's [Policies and Procedures Concerning Academic Dishonesty \(FAM 803.5\)](#) and [Executive Order 1098-Revised 3/29/2019 - Student Conduct Procedures](#), and may be addressed by both the instructor and the Student Conduct Administrator.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified.

Dropping and Adding

You are responsible for understanding the policies and procedures about [add/drops](#), academic renewal, etc. found in the [CSUSB Bulletin](#).

Support for Students with Disabilities

If you are in need of an accommodation for a disability in order to participate in this class, it is your responsibility to seek academic accommodations for a verified disability in a timely manner. Please contact the instructor during the first week of the term and contact [Services to Students with Disabilities](#) (SSD) at (909) 537-5238. SSD must provide documentation to the instructor in order for special accommodations to be made.

If you require assistance in the event of an emergency, you are advised to establish a buddy system with a buddy and an alternate buddy in the class. Individuals with disabilities should prepare for an emergency ahead of time by instructing a classmate and the instructor.

Course Schedule

(Note: subject to change with fair notice.) Here is the anticipated agenda for the semester. All section numbers reference the text, *Calculus by Hughes-Hallett et al.*

Week	Section #	Topic
1	1.1	Function and change
	1.2	Exponential functions
	1.3	New functions from old
	1.4	Logarithmic functions
	1.5	Trigonometric functions
	1.6	Powers, polynomials, and rational functions
2	1.7	Intro to limits
	1.8	Extending the idea of a limit
	1.9	Further limit calculations
3	2.1	How do we measure speed?
	2.2	The derivative at a point
	2.3	The derivative function
4	2.4	Interpretations of the derivative
	2.5	The second derivative
	2.6	Differentiability
5		Recommended Review + Midterm Assessment 1
6	3.1	Powers and polynomials

	3.2	The exponential function
	3.3	The product and quotient rules
7	3.4	The chain rule
	3.5	The trigonometric functions
	3.6	The chain rule and inverse functions
8	3.7	Implicit functions
	3.9	Linear approximation
	3.10	Theorems about differentiable functions
9	4.1	Using first and second derivatives
	4.2	Optimization
10	4.3	Optimization and modeling
	4.4	Families of functions and modeling
11		Recommended Review + Midterm Assessment 2
12	4.5	Applications to marginality
	4.6	Rates and related rates
13	5.1	How do we measure distance traveled?
	5.2	The definite integral
	5.3	The fundamental theorem and interpretations
14	5.4	Theorems about finite integrals
	6.1	Antiderivatives graphically and numerically
	6.2	Constructing antiderivatives analytically

15		Recommended Review
16		Final