

# W22 MATH D001A 25Z Calculus

## Course Description:

This course covers the fundamentals of differential calculus. Specifically, the course includes the basic concepts of analytic geometry, limits, derivatives, and their applications. The topics covered will include graphs and derivatives of algebraic, trigonometric, exponential, logarithmic, and hyperbolic functions. Applications, such as, motion, differentials, related rates, graphing, and optimization, will be covered. There will be a greater focus on mathematical rigor than is often present in precalculus courses, with extra emphasis on definitions, precise notation and logic.

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## Course Content:

- Introduction to limits, definition of limits, theorems on limits, one-sided limits, computation of limits using numerical, graphical, and algebraic approaches, delta-epsilon definition of limit
  - Continuity and differentiability of functions, determining if a function is continuous and differentiable at a real number
  - Limits involving infinity and asymptotes
  - Introduction to derivatives, and the limit definition of the derivative at a real number and as a function
  - Use of differentiation theorems, derivatives of algebraic, trigonometric, inverse trigonometric, exponential, logarithmic, and hyperbolic functions, the chain rule, implicit differentiation, differentiation of inverse functions, higher order derivatives
  - Use of derivatives for applications including equation of tangent lines, related rates, differentials, and Newton's Method
  - Local/relative and global/absolute extrema of functions
  - Rolle's theorem and the Mean Value Theorem
  - The first derivative test, the second derivative test and concavity
  - Graphing functions using first and second derivatives, concavity, and asymptotes
  - Applications of extrema including optimization
  - Indeterminate forms, and L'Hopital's Rule
  - Antiderivatives
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## Important Notes about Online Learning:

- **Communication:** You can contact me via email ([bambhaniadoli@fhda.edu](mailto:bambhaniadoli@fhda.edu)) or via Canvas message. You can expect a response within 24 hours on weekdays and within 48 hours on the weekend. If you don't get a reply back to your email, try Canvas message, and the vice versa.
- **Engagement:** Since we are conducting the class fully online, I will look for your engagement through participation during synchronous sessions, and through the submission of assignments. Be sure to submit all first week and second week assignments to get into the "rhythm" of the class. **Please note that if you're not submitting any assignments during the first two weeks of class, I will assume that you are not interested in the taking the class and may drop you!**
- **Feedback:** Any feedback on your discussions, problem sets and written parts of exams will be provided as annotation or assignment comment in Canvas. If you need additional feedback

regarding grading (especially automatically graded items such as homework and quizzes), please email/message me directly about that assessment. I will aim to grade all items within 1-2 days of submission, but you can expect assignments and assessments to be graded within 1 week of submission.

If, for any reason, you stop participating and intend to drop the class, please do an official drop in a timely manner. If you fail to do so, you will receive an 'F' in the class. Follow the deadlines for this class in My Portal. I do not have the ability to make exceptions to these.

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### **Textbook and Calculator:**

**Great news:** your textbook for this class is available for **free** online!

[Calculus, Volume 1 from OpenStax \(Links to an external site.\)](#), ISBN 1-947172-13-1

You have several options to obtain this book:

- [View online \(Links to an external site.\)](#) (Links to an external site.) (Links to an external site.)
- [Download a PDF \(Links to an external site.\)](#) (Links to an external site.) (Links to an external site.)

You can use whichever formats you want. Web view is recommended -- the responsive design works seamlessly on any device.

You will need a scientific calculator, and occasionally a graphing calculator, for this class. This can be a physical or an online app, such as the one at <https://www.desmos.com/> ([Links to an external site.](#)).

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### **Video Lectures and Prepared Lecture Notes:**

All of the lectures for this class are prerecorded. The PDFs for prepared lecture notes will be shared with you. You can find both in Modules under weekly activities. These are designed to help you keep your lecture notes organized. Please print the prepared lecture notes, or open them on a tablet if you have the ability to annotate electronically. As you watch the prerecorded video lectures, take notes! Keep all your notes organized in a binder. I strongly recommend that you do this. If you don't have access to a printer or a tablet, then simply take notes in a regular notebook, as you would in any other class. I hope that having prerecorded lecture notes provides you with an ability to tailor learning per your needs. Feel free to pause, replay or change the speed, as needed.

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### **Weekly Schedule:**

- **Mondays and Wednesdays:** We will have synchronous Zoom meetings on these days from 5:00-6:15pm. The link can be found in the Zoom tab in Canvas. **The passcode is: calculus.** You're expected to attend each of these meetings. Be sure to watch appropriate lecture videos before attending these meetings. We will use these synchronous meeting times to go over your questions, work on problem sets in groups and take quizzes and exams. PLEASE NOTE: There

are two weeks when the Monday is a holiday. For these weeks (see calendar below), on Wednesday, we will meet from 4:00 to 6:15pm to allow for more time for questions and group work.

- **All days:** Read textbook, watch lecture videos (and take notes on the prepared notes), work on homework, respond to discussion boards, and study!
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### Office Hours:

- Mondays and Wednesdays 9:15 - 10:15 a.m. (Zoom link: <https://fhda-edu.zoom.us/j/94347506117> (Links to an external site.))
  - Tuesdays and Thursdays 12:30 - 1:30 p.m. (Zoom link: <https://fhda-edu.zoom.us/j/92923524526> (Links to an external site.))
  - Or, by appointment (email me to schedule)
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### Homework and Problem Sets

The best way to succeed in any math class is to do all of the assigned work correctly and in a timely manner, making sure you really understand what you are doing! Focus on how to think mathematically about problems, not just on following a procedure! Time spent on the homework and problem sets will directly benefit you on quizzes and exams.

Online Homework: You will have online homework for each section we cover. The homework uses the free software MyOpenMath, and will be graded for correctness. The links and due dates are within the Canvas Modules, but generally speaking, the Online Homework is due twice a week. You will have 5 late passes, each of which will give you a 24-hour extension on the homework for a particular section with 5% penalty.

Problem Sets: Each week, we will have a problem set that you will work on. These problems will be posted as a PDF in the Canvas modules. You are to start work on them in groups in Zoom breakout rooms, work them out on paper, and submit them individually by the deadline on Fridays at 11:59pm. You will start them in class, but will need to finish them up on your own. These sets include problem-solving and critical-thinking exercises that rely on your conceptual understanding of the material and related skills.

#### *Problem Sets Submission Guidelines:*

- *Even though the problems will be discussed in groups, write up your own solutions independently. **never** copy anyone's work for any reason!*
- *Label each problem clearly – use a **highlighter** to mark the number, or put a **box** around it so it's easy to find. You don't need to write the question, just fully-worked out solutions.*
- *Leave some white space around the problem for comments.*
- *Do the problems in **order**, showing all work neatly, clearly and completely.*
- *Write your solutions out in full detail, as modeled in the textbook and in lectures. It's important to write up problem sets neatly, showing all work, and explaining the logic behind each step. You should also draw well-labeled and appropriately scaled diagrams and graphs when they are helpful in understanding your solution.*

- *At the end of the problem set, give a participation **rating** (from 0-4) to each group member, including yourself. The participation rating should be based on how well a group member was prepared to discuss the problems and how well they contributed towards solving the problems. If there were any issues working with your group, please describe.*
  - *Submit a **single PDF document**, NOT multiple images. Use the Notes app on iOS, or a scanning app such as Adobe Scan or Genius Scan (both free), or something else from among many options. Be sure to check that your scanned copy is legible and has correct orientation. I will need to be able to read it for you to get points.*
  - *Problem sets are due on Fridays at 11:59pm. You can have a 24-hour **extension** with 10% penalty.*
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### **Weekly Discussions:**

Each non-exam week, you will have a weekly discussion prompt that you will need to respond to. These are worth points, so be sure to complete them. When grading these posts, I will look for your engagement with the discussion topic through how well you articulate your thoughts (you won't be graded for spelling and grammar, though you should check them). In case of topics where you are asked to post an example of a type of problem, your response must be original. If you draw significant inspiration from elsewhere, you must cite your source (include the link); otherwise, it's plagiarism. Discussion entries will typically be due on Fridays at 11:59pm.

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### **Participation:**

Even though this is an online class, you are expected to actively participate. I expect you to:

- Ask and answer questions during the synchronous portions of our class. You can raise your hand to speak, or use the chat feature in Zoom.
  - Participate actively in breakout rooms:
    - Come prepared, having at least watched the assigned videos.
    - Keep video on throughout. Turn audio on to speak.
    - Use tools such as Share Screen with Zoom whiteboard or your own tablet to aid discussion.
  - Outside of class, post and answer questions in 'Questions Discussion Board' (1 point extra credit for posting or answering a question).
  - You will be given a subjective participation grade throughout the quarter. This will include your participation in class as well as in breakout rooms.
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### **Quizzes:**

We will have **nine** 20-minute quizzes (see the calendar at the bottom of this page). These will usually be similar to your online homework. We will do them during the synchronous portion of class. You will need to complete them on time to receive credit. **IMPORTANT:** *Generally speaking, there will be NO MAKEUPS for any of the quizzes, and your lowest quiz score will be dropped. If you're dealing with an unexpected issue, you're welcome to reach out to me. I will see what I can do to help.*

**Exams:**

We will have **two** midterm exams, and a cumulative final exam. See the calendar for the dates. Exams must be taken at the scheduled time, so pay careful attention to their dates and times. The exams will contain an online portion and a written portion. The written portion will need to be done on paper and scanned (or on a tablet) and submitted by the exam closing time *IMPORTANT: There will be NO MAKEUPS for any of the exams.*

*NOTE: In case of an unforeseen emergency or illness due to which you cannot take an exam, please get in touch with me immediately, and I can work with you to find a solution. If this happens for the final exam, that may result in an 'Incomplete', provided that you supply me with a sufficient proof.*

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**Evaluation:** Your final grade will be computed as follows:

**Point Values of Assignments and Assessments**

<b>Category</b>		<b>Points</b>
Homework	27 @ 5 points each	135
Problem Sets	11 @ 10 points each	110
Weekly Discussions	Top 8 @ 10 points each	80
Participation	3 @ 5 points each	15
Quizzes	Top 8 @ 15 points each	120
Exams	2 @ 70 points each	140
Final Exam		100
<b>TOTAL</b>		<b>700</b>

**Letter Grade based on Overall Percentage**

<b>Overall percentage</b>	<b>Your grade will be at least</b>
97 % or greater	A+
92% to less than 97%	A
89% to less than 92%	A-
87% to less than 89%	B+
82% to less than 87%	B
79% to less than 82%	B-
75% to less than 79%	C+
70% to less than 75%	C
55% to less than 70%	D
less than 55%	F

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## Help:

1. Your classmates are a great resource. Ask for help and provide help to others either within your current groups or using Canvas discussion boards!
  2. Message me through Canvas with questions or attend office hours. For online homework questions, message me by using 'Message Instructor' button in the problem.
  3. Ask questions during our synchronous meetings.
  4. Get help from De Anza's Math Student Success Center. See details at <http://deanza.edu/studentssuccess/>.
  5. Use NetTutor for help through Canvas.
  6. If you need any technical help with MyPortal, Zoom, Canvas, etc., visit <https://www.deanza.edu/online-winter/#Learning> (Links to an external site.).
  7. On the link above, under 'Student Services and Support', you will find links to services with some specific to this time, such as for help with tech equipment, food and financial assistance, health services, resources for undocumented students, etc.
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## Academic Integrity:

All students are expected to exercise academic integrity throughout the term. Any instances of cheating or plagiarism will result in disciplinary action, including at minimum, 0 on the assignment or assessment, but may include recommendation for dismissal. You are encouraged to work together on homework but simply copying down from someone else's work is wrong! Cheating on a quiz or an exam is more serious. It will certainly result in getting a 0 on the assessment, but could result in getting an 'F' in the course or dismissal from the class. Also, each incident of cheating will be reported to the Dean of the Physical Science, Mathematics and Engineering Division and the Office of Student Development. Please see the De Anza College's page on Academic Integrity:

[https://www.deanza.edu/policies/academic\\_integrity.html](https://www.deanza.edu/policies/academic_integrity.html) (Links to an external site.). Check out this video produced by De Anza College on this topic: <https://www.youtube.com/watch?v=4unoOe-I0eY> (Links to an external site.).

A note about Discord: I encourage you to ask and answer questions amongst yourselves to strengthen your understanding of topics in this class using any medium, including Canvas discussion boards and Discord. However, be careful that you don't compromise your academic integrity or entice others to compromise theirs! For example, never answer a classmate's question about a homework problem by providing a complete, fully worked out solution! There are at least two reasons for this: 1) It would create too much of a temptation to copy - not necessarily for the original question poster but other classmates; and 2) Your solution could be incorrect, in which case you would be hindering the class' understanding of the involved concepts and skills. It goes without saying that you should also never discuss anything during a quiz or an exam on Discord or any medium, even after the quiz/exam has been submitted. Some students may have a special accommodation (due to disability, for example) that allows them to have a later submission time. Discussing solutions while their exam is open would compromise the integrity of their submission.

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## Disability Notice:

If you feel that you may need an accommodation based on the impact of a disability, please contact me privately to discuss your specific needs. Also, please contact Disability Support Programs & Services through <https://www.deanza.edu/dsps/> ([Links to an external site.](#)) for information or questions about eligibility, services and accommodations for physical, psychological or learning disabilities.

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## Tips for Success:

- Taking classes online comes with a set of challenges, such as staying motivated, speaking up in class, conflicts with work and other responsibilities, working with classmates, getting help, feeling a sense of community with the class, the lack of ideal workspace, and technical issues, such as device malfunction or unreliable internet access. About half of all students report ‘staying motivated’ as their greatest challenge in online learning.
- In any math class, and especially this one, your goal should be to get **ownership** of the material. This means that not only you understand the concepts, and can demonstrate the skills, but also that you can explain them to someone who doesn’t have them. The material covered in this class is essential for the next courses in the series. This is not a “learn and forget” class; rather, it’s a “learn well so you can succeed going forward” class.
- Here are my recommendations for succeeding in this class in the online setting:
  1. **Log into Canvas every day!** Do some work related to the class every day. Check for upcoming deadlines and make sure you are aware of them.
  2. **Stay on schedule.** Stick to the schedule on the calendar. Don’t fall behind! Be disciplined about this to stay on top of the class. When you watch the videos, take careful notes in the prepared lecture notes. Writing aids memory so you are more likely to retain the material you watched. The quarter passes by faster than expected – especially if you’re new to the quarter system – and it’s almost impossible to catch up, so plan accordingly.
  3. **Be fully present in every synchronous session.** Allowing yourself to occasionally miss class, or multi-task during class, is a slippery slope. It can easily turn into a bad habit that will likely cost you the grade you want in this class.
  4. **Come to the synchronous sessions prepared and ready to contribute!** Be sure to have watched the required videos and completed any required readings so you can benefit from the synchronous sessions and contribute.
  5. **Invite productive struggle.** To succeed in any STEM class, you must **do your work diligently**. I am aware that there are many sources that can provide you the answers and even the worked solutions. However, **productive struggle** is essential in learning and retaining the material, and in gaining the confidence in your problem-solving ability. You must sweat through the problems, especially the ones that challenge you.
  6. **Form a study group.** Exchange your contact information with at least 3 other people in the class community. This will come in handy if you need to miss a class, if you want to work with someone on an assignment, or while studying for an exam. This is an **essential college skill**, especially for STEM students.
  7. **Turn everything in!** Every homework, every discussion, every problem set. Don’t allow yourself to skip! Also, pay close attention to the dates and start/end times of quizzes and exams, so you don’t miss any part of them.

8. **Prepare for quizzes and exams as if they were closed-notes assessments.** Even though all quizzes and exams will be open-book, open-notes, prepare as if you were allowed only paper, pencil and calculator. Preparing this way for quizzes will help you retain the material for exams. Preparing this way for exams will help you retain this material for when you need it for the classes that come next in the sequence. If you are not prepared well for quizzes and exams, you will likely NOT be able to finish them!
  9. **Don't wait to ask for help!** Whether it's to your classmates or me, get your questions answered in a timely manner. If you're dealing with an unusual or an unexpected challenge, please let me know so I can work with you to keep the class manageable, if possible.
  10. **Practice personal discipline!** Succeeding in a college class requires **personal discipline**. This is especially true for online classes. It's quite easy to put things off until later, skip some video lectures, skip taking notes while watching them, distract yourself with social media and other apps while doing class activities, etc. A life skill you should practice this quarter: **Be mindful of what you are giving your attention to.** Think carefully about your priorities, and give the most time and attention to your biggest priorities. When working on your homework, turn off all notifications on your devices, silence your phone and keep it out of immediate reach. Calculus requires focus and it will often challenge you. Don't put off working on something because it's hard or unpleasant. Learning anything that's worthwhile requires a sustained effort! And that practice is what ultimately leads to true personal growth.
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## Course Calendar:

### Math 1A (4:00pm) Calculus - Tentative Calendar: Winter 2022

	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Week 1	31-Dec <i>Watch: 2.1, 2.2</i>	1-Jan	2-Jan	3-Jan Orientation/Questions Problem Set 1	4-Jan <i>Watch: 2.3</i>	5-Jan Questions Problem Set 1 <b>Quiz 1</b> (on 2.1, 2.2, 2.3)	6-Jan Problem Set 1 due
Week 2	7-Jan <i>Watch: 2.4, 2.5</i>	8-Jan	9-Jan	10-Jan Questions Problem Set 2	11-Jan <i>Watch: 3.1</i>	12-Jan Questions Problem Set 2 <b>Quiz 2</b> (on 2.4, 2.5, 3.1)	13-Jan Problem Set 2 due
Week 3	14-Jan <i>Watch: 3.2</i>	15-Jan	16-Jan	17-Jan MLK Jr Holiday	18-Jan <i>Watch: 3.3</i>	19-Jan Questions *** Problem Set 3 <b>Quiz 3</b> (3.2, 3.3)	20-Jan Problem Set 3 due
Week 4	21-Jan <i>Watch: 3.4, 3.5</i>	22-Jan	23-Jan	24-Jan Questions Problem Set 4	25-Jan <i>Watch: 3.6</i>	26-Jan Questions Problem Set 4 <b>Quiz 4</b> (3.4, 3.5, 3.6)	27-Jan Problem Set 4 due
Week 5	28-Jan <i>Watch: 3.7</i>	29-Jan	30-Jan	31-Jan Questions Problem Set 5	1-Feb <i>Watch: 3.8</i>	2-Feb Questions <b>Midterm Exam 1</b> (on 2.1 - 3.8)	3-Feb Problem Set 5 due
Week 6	4-Feb <i>Watch: 3.9</i>	5-Feb	6-Feb	7-Feb Questions Problem Set 6	8-Feb <i>Watch: 6.9</i>	9-Feb Questions Problem Set 6 <b>Quiz 5</b> (on 3.9, 6.9)	10-Feb Problem Set 6 due
Week 7	11-Feb <i>Watch: 7.1, 7.2 (Vol 2)</i>	12-Feb	13-Feb	14-Feb Questions Problem Set 7	15-Feb <i>Watch: 4.1</i>	16-Feb Questions <b>Quiz 6</b> (on 7.1, 7.2, 4.1)	17-Feb Problem Set 7 due
Week 8	18-Feb <i>Watch: 4.2</i>	19-Feb	20-Feb	21-Feb Presidents' Holiday	22-Feb <i>Watch: 4.3</i>	23-Feb Questions *** Problem Set 8 <b>Quiz 7</b> (on 4.2, 4.3)	24-Feb Problem Set 8 due
Week 9	25-Feb <i>Watch: 4.4</i>	26-Feb	27-Feb	28-Feb Questions Problem Set 9	1-Mar <i>Watch: 4.5</i>	2-Mar Questions <b>Midterm Exam 2</b> (on 3.9, 6.9, 7.1, 7.2, 4.1-4.5)	3-Mar Problem Set 9 due
Week 10	4-Mar <i>Watch: 4.6</i>	5-Mar	6-Mar	7-Mar Questions Problem Set 10	8-Mar <i>Watch: 4.7</i>	9-Mar Questions Problem Set 10 <b>Quiz 8</b> (on 4.6, 4.7)	10-Mar Problem Set 10 due
Week 11	11-Mar <i>Watch: 4.8, 4.9</i>	12-Mar	13-Mar	14-Mar Questions Problem Set 11	15-Mar <i>Watch: 4.10</i>	16-Mar Questions Problem Set 11 <b>Quiz 9</b> (on 4.8, 4.9, 4.10)	17-Mar Problem Set 11 due
Finals Week	18-Mar <i>Prepare for Final Exam</i>	19-Mar	20-Mar	21-Mar	22-Mar	23-Mar <b>Final Exam</b> <b>4 - 6 p.m.</b>	24-Mar

\*\*\* On January 20th and February 24, we will meet 4:00-6:15pm to allow for question/answer time and groupwork time since Monday is a holiday. On other days, we will meet 5:00-6:15pm.



**Student Learning Outcome(s):**

- \*Analyze and synthesize the concepts of limits, continuity, and differentiation from a graphical, numerical, analytical and verbal approach, using correct notation and mathematical precision.
- \*Evaluate the behavior of graphs in the context of limits, continuity and differentiability.
- \*Recognize, diagnose, and decide on the appropriate method for solving applied real world problems in optimization, related rates and numerical approximation.