

# Introduction to Mathematics for Business and Economics

University of Southern California

## Course and instructor information

**Course ID:** MATH 117g  
**Section:** 39419R  
**Units:** 4  
**Term:** Fall 2020

**Prerequisite:** MATH 040  
**Lecture:** MWF, 10-10:50am ([Zoom room](#))  
**Discussion:** TTh, 8-8:50am ([Zoom room](#))  
TTh 9-9:50am ([Zoom room](#))

**Instructor:** Jared Warner  
**Office:** [Dr. J's Zoom room](#)  
**Office hours:** MW, 3-4pm, T, 9-10pm  
**E-mail:** [hjwarner@usc.edu](mailto:hjwarner@usc.edu)

**TAs:** Xinzhou Su (Th), Kaiheng Zou (T)  
**Office:** [Math Center](#)  
**Office hours:** M, 11am-1pm, Th, 10am-12pm  
**E-mail:** [xinzhou@usc.edu](mailto:xinzhou@usc.edu), [kaihengz@usc.edu](mailto:kaihengz@usc.edu)

**Course Description:** Functions, graphs, polynomial and rational functions, exponential and logarithmic functions, matrices, systems of linear equations.

## Course materials and resources



**Textbook (optional):** Carl Stitz and Jeff Zeager. *Precalculus:* Version  $[\pi] = 3$ , Corrected Edition. <https://www.stitz-zeager.com/szprecalculus07042013.pdf>. We will not follow the textbook very closely, but it is a source of additional reading if that is helpful to you.



**Desmos (recommended):** We will use a free online math program called [Desmos](#) quite a bit in class. You don't need an account to use Desmos, but if you make an account the work you do on activities and assignments will be saved to your account. To create an account, go to [www.desmos.com](http://www.desmos.com) and click on "Sign Up".



**Gradescope (required):** All course assignments and assessments will be submitted through [Gradescope](#). We will learn how to use Gradescope together in class, but you can familiarize yourself by watching [this video](#) or reading [this guide](#). You should have received an e-mail from Gradescope to sign up for our course - if you didn't, please e-mail the instructor.



Blackboard

**Blackboard (recommended):** All course announcements, content, and assignments will be posted to our Blackboard course shell. You should check Blackboard regularly to receive current information about our course.

## Learning outcomes

The course will focus on the 15 learning outcomes listed below. Each outcome is a statement of what you will be able to do upon successfully completing the course. The outcomes are split into three units, and each unit will take approximately one month of class time.

Outcome	Textbook sec.
<b>A:</b> Use and interpret function notation	1.3, 1.4, 1.6
<b>B:</b> Write linear functions and solve linear equations	2.1
<b>C:</b> Optimize a linear function given constraints	NA
<b>D:</b> Find and interpret a function's average rate of change on an interval	2.1
<b>E:</b> Graph transformations of functions	1.7
<b>F:</b> Solve quadratic equations	2.3
<b>G:</b> Find the vertex of a quadratic function	2.3
<b>H:</b> Solve polynomial equations	3.2
<b>I:</b> Identify features of rational functions	4.1, 4.2
<b>J:</b> Solve rational equations	4.3
<b>K:</b> Model exponential growth and decay	6.1, 6.5
<b>L:</b> Use logarithms to solve exponential equations	6.2, 6.3
<b>M:</b> Use the natural base to study continuous growth and decay	6.1, 6.5
<b>N:</b> Use Gauss-Jordan elimination to solve a system of linear equations	8.1, 8.2
<b>O:</b> Find the inverse of a matrix	8.4

## Grading system

This course will use a mastery-based grading system that is designed to

- keep our focus on the learning outcomes of the course,
- emphasize deep understanding of course concepts,
- provide multiple opportunities for students to demonstrate mastery of concepts, and
- accommodate students with varying mathematical backgrounds and learning styles.

Below is a description of the various components of the grading system that will collectively determine your grade: opportunities, jubilees, assignments, and the final.

**Opportunities:** At the end of each unit, you will receive an “Opportunity” to demonstrate mastery of the learning outcomes covered in that unit. Each Opportunity is 10 questions long

(2 questions for each outcome in the unit), with 6 questions given in class and 4 questions given in discussion the following day. Each question is worth 2 points for a total of 20 points per opportunity with points awarded according to the following descriptions.

- 2 points (full credit) - Your solution demonstrates enough understanding that you do not need to revisit the learning outcome for full credit.
- 1 point (partial credit) - Your solution work demonstrates some understanding but it would be valuable for you to revisit the learning outcome to achieve further mastery.
- 0 points (no credit) - Your solution demonstrates little to no understanding so you should certainly revisit the learning outcome to gain more understanding.

**Jubilees:** If you don't get full credit on some opportunity questions, jubilees can give you another chance. You can take a jubilee in discussion section about one week after an opportunity and it may contain questions similar to those you've missed on previous opportunities. If you can answer the jubilee questions correctly, you will be awarded full credit. The questions your jubilee contains depend on how many practice problems you've completed (see "Practice and extra chances" below). Opportunities and jubilees are completed individually, with no help from another person, but you may use your notes, the textbook, a calculator, and the internet. You are required to show all of your work, otherwise you might not receive full credit. Click [here](#) to view the format of an opportunity (jubilees have the same format).

**Assignments:** Each unit has an assignment designed to facilitate the application of course concepts within a given context. Assignments involve following specified instructions to explore the relevance of math to real-world circumstances and then writing a short report summarizing your findings. You are free to seek assistance from *anyone* to complete the assignment instructions. However, the report should be completed on your own and represent your own words. Reports can be submitted on any of four drop-off dates, and can be resubmitted for a new grade if you complete enough practice problems for the corresponding unit (see "Practice and extra chances" below). Assignments are worth 5 points each, and will be graded within two days of submission.

**Final:** The final will be comprehensive and is worth 25 points. In the event that you demonstrate mastery of one of our course outcomes on the final for which you did not receive full credit yet, you can petition to receive this credit by bringing your performance on the final to my attention. The date of the final is to be determined, and will be announced on Blackboard.

**Grade:** Your total score will be a sum of your outcome scores as achieved on opportunities and jubilees (out of 60), assignment scores (out of 15), and final score (out of 25). There are 100 points available in the class, and your final letter grade in the course will be determined using the ranges below, with the exception that you will receive an F if you do not take the final (no matter what your total score is).

A 91 to 100	A- 87 to 90	B+ 83 to 86	B 79 to 82	B- 75 to 78	C+ 70 to 74
C 66 to 69	C- 62 to 65	D+ 58 to 61	D 54 to 57	D- 50 to 53	F 0 to 49

## Practice and extra chances

Like most skills, mathematical proficiency is gained through practice. Practice in this course has no direct impact on your final grade, but instead unlocks extra chances for full credit on jubilees and assignments. Below we describe two types of practice available to you, and how your practice earns you extra chances for full credit.

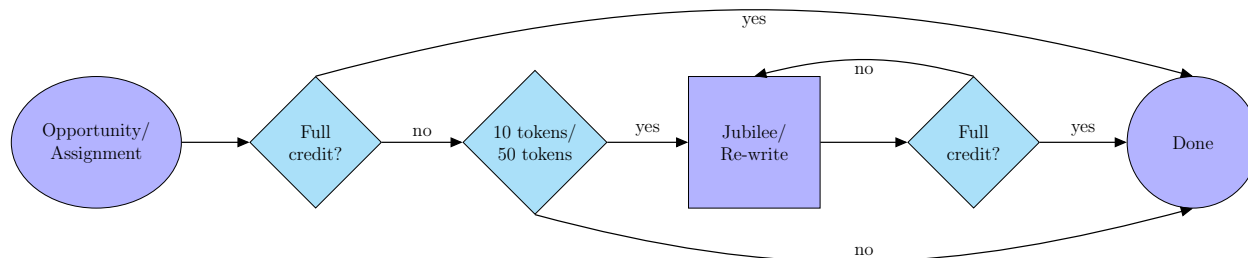
**MyOpenMath problems:** Each learning outcome has 10 MyOpenMath problems on Blackboard. Each MyOpenMath problem is worth 1 practice token. The MyOpenMath problems have no due date, and can be completed for practice tokens at any time.

**Discussion problems:** Each learning outcome has 5 discussion problems that will be posted on Gradescope. Each discussion problem is worth 2 practice tokens. Discussion problems have due dates, should be handwritten and submitted on Gradescope, and are graded for completion. The teaching assistant's primary role in discussion is to help students complete discussion problems.

Discussion problem due dates		
<b>A:</b> 8/25	<b>F:</b> 9/22	<b>K:</b> 10/20
<b>B:</b> 8/27	<b>G:</b> 9/29	<b>L:</b> 10/27
<b>C:</b> 9/1	<b>H:</b> 10/1	<b>M:</b> 10/29
<b>D:</b> 9/8	<b>I:</b> 10/6	<b>N:</b> 11/3
<b>E:</b> 9/15	<b>J:</b> 10/13	<b>O:</b> 11/10

**Extra chances:** Each outcome has a total of 20 practice tokens available (10 from MyOpenMath problems, and 10 from discussion problems) so each unit has a total of 100 practice tokens available. If you earn at least 10 practice tokens for an outcome, you unlock extra chances for that outcome's questions on all future jubilees. If you earn at least 50 practice tokens for a unit, you unlock extra chances for that unit's assignment on all future assignment drop-off dates.

To illustrate how this works, suppose that on Opportunity 1 you were unable to get full credit for questions from learning outcome A, "Use and interpret function notation." If you complete enough MyOpenMath problems and/or discussion problems for outcome A to get 10 practice tokens, then questions similar to those you missed will appear on all subsequent jubilees. Similarly, if you don't get full credit on Assignment 1 but you have 50 practice tokens for unit 1, then you can re-write and re-submit your assignment for a new grade on all subsequent drop-off dates. See the flow chart below for a summary of how practice gives you extra chances for full credit.



## Tips for success

**Pay attention to your progress reports:** You will regularly receive a progress report in your email inbox to help you keep track of your outcome scores, your assignment scores, and your practice tokens. Make sure you know how to read this progress report so you can maintain progress toward achieving the grade you want. Click [here](#) to see a sample progress report.

**Learn from your mistakes:** When you get back a graded opportunity, make sure you understand every mistake you made, and practice solving those problems again to be ready for the jubilees. Subsequent questions on the jubilees will be very similar, so be sure not to make the same mistakes again.

**Take class time and the practice problems seriously:** Class activities and the practice problems are designed to set you up for success on the opportunities. The best way to prepare for opportunities is to participate in class and complete all of the practice problems.

**Get off to a good start:** Try to do well on early opportunities, and don't let assignment drop-off dates pass you by without submitting an assignment. The grading system provides for flexibility but the course will move fast. If you save too many outcomes and assignments for later, they will accumulate. If you improve your scores as much as you can in the beginning, then you will have fewer outcomes and assignments to focus on later in the semester.

## Schedule

Below is a tentative schedule for the course. Please note all opportunity, jubilee, and assignment drop-off dates. Amendments to this schedule will be announced on Blackboard.

Dates	Topic	Notes
8/17	Course introduction	MyOpenMath and Gradescope sign-up
8/19, 8/21	Use and interpret function notation	
8/24, 8/26	Write linear functions and solve linear equations	
8/28, 8/31	Optimize a linear function given constraints	
9/2, 9/4	Find and interpret a function's average rate of change on an interval	

9/9, 9/11	Graph transformations of functions	
9/14	Review Unit 1	Assignment 1 introduced
9/16	Opportunity 1	9/16 - 6 questions in lecture 9/17 - 4 questions in discussion
9/18, 9/21	Solve quadratic equations	9/21 - Assignment drop-off date
9/23, 9/25	Find the vertex of a quadratic function	9/24 - Jubilee 1 in discussion
9/28, 9/30	Solve polynomial equations	
10/2, 10/5	Identify features of rational functions	
10/7, 10/9	Solve rational equations	
10/12	Review Unit 2	Assignment 2 introduced
10/14	Opportunity 2	10/14 - 6 questions in lecture 10/15 - 4 questions in discussion
10/16, 10/19	Model exponential growth and decay	10/19 - Assignment drop-off date
10/21, 10/23	Use logarithms to solve exponential equations	10/22 - Jubilee 2 in discussion
10/26, 10/28	Use the natural base to study continuous growth and decay	10/28 - Assignment 3 introduced
10/30, 11/2	Use Gauss-Jordan elimination to solve a system of linear equations	
11/4, 11/6	Find the inverse of a matrix	
11/9	Opportunity 3	11/9 - 6 questions in lecture 11/10 - 4 questions in discussion
11/11	Review	

11/13	Jubilee 3	Assignment drop-off date
TBD	Final	
TBD	No class	Assignment drop-off date

## Policies and statements

**Zoom etiquette:** As we attempt to create an online learning community together, you are strongly encouraged to turn your camera on during lecture and discussion. At no point will you be required to turn on your camera, but doing so will help foster a collaborative environment in which we can all best learn mathematics given the online nature of the course. To minimize outside noise, it is helpful if you keep your microphone muted while you are not speaking.

**No makeups or late submissions:** There are no makeup opportunities, jubilees, or assignments. The course is already designed to give many chances to demonstrate mastery of course outcomes, so if you miss one chance you should focus on taking advantage of the next one.

**Statement on academic integrity:** USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. SCampus, the Student Guidebook, contains the University Student Conduct Code (see University Governance, Section 11.00), while the recommended sanctions are located in Appendix A.

**Statement for students with disabilities:** Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to the instructor (or the teaching assistant) as early in the semester as possible. DSP is located in GFS 120 and is open 8:30 a.m.–5:00 p.m., Monday through Friday.

Website: <https://dsp.usc.edu/>

Contact information: (213) 740-0776 (Phone), (213) 740-6948 (TDD only), (213) 740-8216 (FAX) dspfrontdesk@usc.edu.

## Support resources

### **Office hours**

Please “stop by” to visit me! Office hours are a time for your to ask me about any misunderstandings you have about the course. You can ask for help on practice problems, on assignments, and on preparing for opportunities and jubilees. I will be in [my personal meeting room on Zoom](#).

### **Math Center**

The [USC Math Center](#) is a place to go if you want help with your math classes. Please visit the [Math Center Zoom room](#) for assistance.

### **Counseling and Mental Health**

**Phone:** (213) 740-9355 (available 24/7)

**Website:** [studenthealth.usc.edu/counseling](http://studenthealth.usc.edu/counseling)

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

### **National Suicide Prevention Lifeline**

**Phone:** 1 (800) 273-8255 (available 24/7)

**Website:** [suicidepreventionlifeline.org/](http://suicidepreventionlifeline.org/)

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

### **Relationship and Sexual Violence Prevention Services (RSVP)**

**Phone:** (213) 740-9355 (24/7, press “0” after hours)

**Website:** [studenthealth.usc.edu/sexual-assault](http://studenthealth.usc.edu/sexual-assault)

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

### **Office of Equity and Diversity (OED)**

**Phone:** (213) 740-5086, Title IX - (213) 821-8298

**Website:** [equity.usc.edu](http://equity.usc.edu), [titleix.usc.edu](http://titleix.usc.edu)

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

### **Reporting Incidents of Bias or Harassment**

**Phone:** (213) 740-5086 or (213) 821-8298

**Website:** [usc-advocate.symplicity.com/care\\_report](http://usc-advocate.symplicity.com/care_report)

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity —Title IX for appropriate investigation, supportive measures, and response.

### **The Office of Disability Services and Programs**

**Phone:** (213) 740-0776

**Website:** [dsp.usc.edu](http://dsp.usc.edu)

Support and accommodations for students with disabilities. Services include assistance in



providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

### **USC Campus Support and Intervention**

**Phone:** (213) 821-4710

**Website:** [campussupport.usc.edu](http://campussupport.usc.edu)

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

### **Diversity at USC**

**Phone:** (213) 740-2101

**Website:** [diversity.usc.edu](http://diversity.usc.edu)

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

### **USC Emergency**

**Phone:** UPC: (213) 740-4321, HSC: (323) 442-1000 (available 24/7)

**Website:** [dps.usc.edu](http://dps.usc.edu), [emergency.usc.edu](http://emergency.usc.edu)

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

### **USC Department of Public Safety**

**Phone:** (213) 740-6000 (available 24/7)

**Website:** [dps.usc.edu](http://dps.usc.edu)

Non-emergency assistance or information.