

Math 112: Calculus I, sections 002–007

Syllabus: Fall 2011

Instructor: Paul Jenkins, 320 TMCB, 422-5868, jenkins@math.byu.edu

Office Hours: 1:30–2:30 MWF

Classroom and Time: 3108 JKB, 10:00–10:50 MWF

Text: *Single Variable Calculus Early Transcendentals, 7th Edition, Volume 1: Chapters 1-6*
by James Stewart

TA, Sections 002 and 007: Nathan Green, 367 TMCB, jaicouru@gmail.com

Office Hours: 12:00–12:50 PM MWF (Wednesday in Math Lab)

Section 2: 112 TMCB TTh 10:00–10:50 AM

Section 7: 331 TMCB TTh 2:00–2:50 PM

TA, Sections 003 and 004: Chris Guzman, 300 TMCB, guzman2020@gmail.com

Office Hours: 10:00–10:50 AM TTh, 4:00–4:50 PM M (Tuesdays in Math Lab)

Section 3: 136 TMCB TTh 1:00–1:50 PM

Section 4: 136 TMCB TTh 2:00–2:50 PM

TA, Sections 005 and 006: Mason Victors, 295 TMCB, mvictor@math.byu.edu

Office Hours: 1:00–1:50 PM TTh, 3:00–3:50 PM Fridays in Math Lab

Section 5: 136 TMCB TTh 12:00–12:50 PM

Section 6: 121 TMCB TTh 8:00–8:50 AM

Course website: Course materials and online homework will be at <http://mathonline.byu.edu>. Log in with your Route Y ID and password; you will see a list of math courses. Choose the appropriate Math 112 section. The first time you log in, you will need an enrollment key, which is your TA's last name, in all lowercase letters.

Prerequisites: Math 110 and 111 or the equivalent. This includes College Algebra and Trigonometry, but could also be satisfied with a good course in Precalculus. Students will also be required to take a pretest in order to exhibit competency in these areas. (See below.)

Pretest: Successful completion of Math 112 requires a solid background in both College Algebra and Trigonometry. Students are required to take a pretest on these topics. The pretest is worth 1 homework assignment; it is also **required** before the calculus committee will grade the final. A pretest review can be found at mathonline <http://mathonline.byu.edu>.

To take the pretest: Log into <http://mathonline.byu.edu> with your Route Y ID and password. Click on Pretests and placement exams. Scroll down to the Math 112 section. The review is one link, the exam the other. When you are ready to take the pretest, make sure you select the math 112 link. There are three other pretests on the site.

While you take the pretest, you will notice at the bottom of the page a “save without submitting” button. Select this after each answer. If you lose your internet connection, you can come back and finish the quiz later. Select “submit all” when you are done with the exam.

You will need to **finish** the pretest before Saturday, September 10 at 11:55 p.m. You are allowed 2 chances to pass. If your score is below 75% then you probably do not have

the necessary skills to succeed in calculus without putting in a lot of effort to learn this prerequisite material. Talk to me about your options, and what you can do to better prepare yourself.

Preparation Time: Adequately prepared students should expect to spend a minimum of three hours of work per week for each credit hour. This adds up to a minimum of 12 hours per week for Math 112. A minimal time commitment is likely to lead to an average grade or lower; much more time may be required to achieve excellence. Note also that hard work is more important than natural ability.

Help: In addition to my office hours and the TAs' office hours, free help with Math 112 problems is available in the Math Lab (159 TMCB). However, if you don't understand most of the problems on an assignment, you should come see me or your TA. Do not let the Math Lab TAs or a personal tutor help you with every problem, or you will not have the independent mathematics skills needed to do well on the exams.

Learning Outcomes: Students are expected to master the "core topics" of Math 112, consisting of the material in the first five chapters of the text. In particular, students are expected to master the following topics:

Limits and Continuity: Students will be able to work with limits and continuity of functions. In particular, they will:

- compute limits of functions described algebraically and graphically,
- determine when functions are continuous, identify discontinuities and asymptotes,
- use definitions, limit laws, or the Squeeze theorem to prove a limit is a given value,
- state and apply the Intermediate Value Theorem to prove facts about continuous functions.

The Derivative and Applications: Students will be able to take and apply derivatives fluently. In particular, they will:

- state the definition of a derivative, use it to compute derivatives, and explain its interpretations as slope and rate of change,
- compute derivatives of elementary functions and their combinations using derivative rules,
- prove facts about derivatives using the definition, derivative rules, as well as Rolle's theorem and the Mean Value Theorem,
- use the derivative to sketch curves, optimize functions, evaluate limits with L'Hôpital's rule, find related rates, and approximate functions and their roots.

The Integral: Students will be able to integrate simple functions, and know when and how to apply the integral. In particular, they will:

- state the definition of the definite integral, approximate it by Riemann sums, compute it as a limit of Riemann sums, and explain its interpretations as area and net change,
- use properties of the integral, such as those pertaining to the interval of integration, to simplify, estimate, and compute integrals,
- state and apply the Fundamental Theorem of Calculus, both to evaluate integrals, and to find derivatives of functions defined as definite integrals,
- use simple substitutions to evaluate integrals.

Assignments: Generally, homework assignments will be assigned every day, with an online part and a written part, turned in separately as explained below. Late homework will not be accepted. The lowest six homework scores will not be figured into your final grade. This accommodates for minor illnesses or other disruptions to your regular schedule that might prevent you from turning an assignment in on time.

Online homework can be found at <http://mathonline.byu.edu>. Login with your Route Y ID and password, and select your class. The first time you log in, you will need an enrollment key, which is your TA's last name, in all lowercase letters. (This name appears after my name in the link.) Homework assignments are listed; click on one to begin. Submit your answers anytime before the assignments close. Assignments typically close at 5:00 am on Monday, Wednesday, and Friday. If you get a problem wrong, you may resubmit repeatedly until you get the correct answer, until the online assignment closes.

Written assignments will generally be collected in discussion section on Tuesdays and Thursdays. Solutions should be clearly labeled and in order. The style of your written solutions should be very much like that of a text book example; solutions should contain enough explanation so that one of your classmates would be able to easily understand what you have done. Generally, it is inadequate to merely write down a final answer. Homework that is not stapled, is excessively sloppy, or is written on paper torn from a spiral notebook may receive less than full credit.

You are strongly encouraged to study together and work together on homework assignments. However, you each must submit your own assignment. Everything you turn in should be in your own words and you should thoroughly understand everything you write down or submit to the computer.

Grading:

- 30% Homework assignments
- 45% 3 Midterm Exams (15% each)
- 25% Final Exam

Midterm Exams: There will be three midterm exams in the Testing Center, as follows:
Exam 1: September 30–October 3, late day October 4, Chapters 1 and 2
Exam 2: October 24–October 26, late day October 27, Chapter 3
Exam 3: November 14–November 16, late day November 17, Chapter 4

Common Final Exam and Grades: A common final exam is given to all students in all sections of Math 112. This assists the Mathematics Department in fairly assessing students' knowledge of calculus and in assigning grades fairly. The percentile ranking of each student relative to all students in all sections will be computed based on the final exam scores. Using this information the Calculus Committee will compute an average grade for each section. It is department policy that the average grade for each section should match its average grade on the common final exam. No calculators, books, or notes will be permitted during the final exam. The final exam will be given on **Tuesday, December 13 from 7:00-10:00 p.m.** The room assignment for your section will not be given until later in the semester. It will likely *not* be your assigned classroom.

Electronic Devices: Do not use mobile phones or permit them to ring during class. Calculators are not permitted on exams.

BYU Honor Code: In keeping with the principles of the BYU Honor Code, students are expected to be honest in all of their academic work. Academic honesty means, most fundamentally, that any work you present as your own must in fact be your own work and not that of another. Violations of this principle may result in a failing grade in the course and additional disciplinary action by the university. Students are also expected to adhere to the Dress and Grooming Standards. Adherence demonstrates respect for yourself and others and ensures an effective learning and working environment. It is the university's expectation, and my own expectation in class, that each student will abide by all Honor Code standards. Please call the Honor Code Office at 422-2847 if you have questions about those standards.

Preventing Sexual Discrimination and Harassment: Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education. Title IX covers discrimination in programs, admissions, activities, and student-to-student sexual harassment. BYU's policy against sexual harassment extends not only to employees of the university, but to students as well. If you encounter unlawful sexual harassment or gender-based discrimination, please talk to your professor; contact the Equal Employment Office at 422-5895 or 367-5689 (24 hours); or contact the Honor Code Office at 422-2847.

Students with Disabilities: Brigham Young University is committed to providing a working and learning atmosphere that reasonably accommodates qualified persons with disabilities. If you have any disability which may impair your ability to complete this course successfully, please contact the Services for Students with Disabilities Office (422-2767). Reasonable academic accommodations are reviewed for all students who have qualified, documented disabilities. Services are coordinated with the student and instructor by the SSD Office. If you need assistance or if you feel you have been unlawfully discriminated against on the basis of disability, you may seek resolution through established grievance policy and procedures by contacting the Equal Employment Office at 422-5895, D-285 ASB.

Lecture Date	Section	Assigned Paper Exercises	Paper Due Date	Online Due Date
Aug 29		Introduction		
Aug 30	1.1/1.2	Functions	1.1: 3, 12, 21, 46, 55, 72; 1.2: 4, 5, 8	Sep 1
Aug 31	1.3/Appx D	New functions from old/ Trig	1.3: 1, 13, 21, 33, 47, 55; Appx D: 24, 27, 37, 46, 73, 79	Sep 6
Sep 2	1.5	Exponential Functions	1, 3, 11, 12, 19, 23, 24, 25	Sep 6
Sep 5		Holiday (Sep 5)		
Sep 7	1.6	Inverse Functions and Logarithms	18, 20, 48, 49, 71, 75	Sep 13
Sep 9	2.1/2.2	Tangent and velocity/ Limits	2.1: 4, 5; 2.2: 6, 9, 16, 33, 34, 38a, 43, 46	Sep 13
Pretest must be completed and submitted by Sep 10, 11:55 p.m.				
Sep 12	2.4	The Precise Definition of a Limit	1, 2, 11, 15, 16, 20, 23	Sep 15
Sep 14	2.3	Calculating Limits	10, 17, 20, 21, 25, 26, 28	Sep 20
Sep 16	2.3	Calculating Limits (cont.)	38, 39, 41, 44, 57, 58, 60	Sep 20
Sep 19	2.5	Continuity	4, 6, 7, 17, 20, 23, 25, 47ab, 62	Sep 22
Sep 21	2.5	Continuity (cont.)	35, 36, 40, 41, 43, 45, 48, 49, 53	Sep 27
Sep 23	2.6	Limits at Infinity and Asymptotes	4, 5, 7, 10, 13, 35, 43, 50	Sep 27
Sep 26	2.7	Derivatives and Rate of Change	3ab, 7, 12, 17, 18, 19, 21, 22, 33, 47, 48	Sep 29
Sep 28	2.8	The Derivative as a Function	3, 5, 6, 11, 22, 27, 40, 46. Prove if f diff at a then f cont at a.	Oct 4
Sep 29	Rev	Exam Review		
Sep 30	Rev	Chapter 1 and 2 Review	Ch1 review p 73: 11, 17, 23, 25; Ch2 review p 167: 2, 33, 48	Oct 4
Exam 1: Sep 30-Oct 3, late day Oct 4. Chapters 1 and 2.				
Oct 3	3.1	Deriv. of Polys and Exponentials	2, 4, 11, 16, 23, 55, 61, 74, 77	Oct 6
Oct 5	3.2	The Product and Quotient Rules	2, 11, 13, 23, 24, 32, 33, 42, 49, 51, 59	Oct 11
Oct 7	3.3	Derivatives of Trig. Functions	9, 10, 18, 20, 35, 42, 45, 49	Oct 11
Oct 10	3.4	The Chain Rule	12, 19, 24, 25, 31, 41, 47, 63, 65, 91, 92	Oct 13
Oct 12	3.5	Implicit Differentiation	3, 11, 15, 21, 36, 53, 55, 63, 77	Oct 18
Oct 14	3.6	Derivatives of Log Functions	7, 16, 24, 27, 33, 40, 46, 47, 53	Oct 18
Oct 17	3.8	Exponential Growth and Decay	3a, 9, 14	Oct 20
Oct 19	3.9	Related Rates	2, 27, 30, 35	Oct 25
Oct 20	Rev	Exam Review		
Oct 21	3.10/3.11	Linear Approx/Hyperbolic Functions	3.10: 1, 2, 3, 5, 23, 28, 43; 3.11: 3, 7, 9, 15, 23, 33	Oct 25
Oct 24	Rev	Chapter 3 Review	None	Oct 26
Exam 2: Oct 24-26, late day Oct 27. Chapter 3.				
Oct 26	4.1	Maximum and Minimum Values	3, 7, 9, 10, 11, 13, 35, 38, 57, 60, 74, 76	Nov 1
Oct 28	4.2	The Mean Value Theorem	7, 15, 17, 28, 29, 30, 35	Nov 1
Oct 31	4.3	Shape of a Graph	1, 6, 7, 21, 23, 25, 28, 32, 62, 74	Nov 3
Nov 2	4.4	L'Hospital's Rule	4, 11, 17, 29, 33, 41, 50, 57	Nov 8
Nov 4	4.5	Curve Sketching	34, 49, and turn in graphs from online homework	Nov 8
Nov 7	4.7	Optimization Problems	20, 28, 30, 35, 57	Nov 10
Nov 9	4.8	Newton's Method	1, 2, 3, 4, 29	Nov 15
Nov 10	Rev	Exam Review		
Nov 11	4.9	Antiderivatives	12, 15, 17, 27, 34, 41, 51, 53, 55, 69, 71	Nov 15
Nov 14	Rev	Chapter 4 Review	15, 18, 29, 45, 52	Nov 17
Exam 3: Nov 14-16, late day Nov 17. Chapter 4.				
Nov 16	Appdx E	Sigma Notation	5, 10, 13, 20, 23, 30, 35, 41cd, 43	Nov 22
Nov 18	5.1/5.2	Areas & Distance/Definite Integral	5.1: 1a, 14, 21, 23; 5.2: 5ab, 17, 29, 30, 71	Nov 22
Nov 21	5.2	The Definite Integral (cont.)	33, 37, 43, 47, 49, 50, 51, 52, 59	Nov 29
Nov 22	5.3	Fundamental Theorem of Calculus	1, 3, 9, 12, 15, 55, 58, 62, 67	Nov 29
Nov 23-25		Thanksgiving Holiday		
Nov 28	5.3	Fund. Theorem of Calculus (cont.)	22, 29, 31, 43, 45, 63, 69, 70, 78	Dec 1
Nov 30	5.4	Indefinite Integrals and Net Change	9, 29, 35, 45, 51, 54, 56, 59, 61, 63	Dec 6
Dec 2	5.5	The Substitution Rule	5, 9, 18, 25, 38, 47, 48, 59, 67, 70, 77, 87	Dec 6
Dec 5	Rev	Chapter 5 Review	7, 51, 57, 66, 67	Dec 8
Dec 6	Rev	Review for Final		
Dec 7	Rev	Review for Final		
Dec 8	Rev	Review for Final		
Dec 9		Reading Day		
Dec 13		FINAL EXAM 7-10 pm	Location TBA	