University of New Mexico-Math 1512: Calculus I

Spring 2022

Course Description

Limits. Continuity. Derivative: definition, rules, geometric interpretation and as rate-of-change, applications to graphing, linearization and optimization. Integral: definition, fundamental theorem of calculus, substitution, applications such as areas, volumes, work, averages. Meets NM-CCN 1614.

Required Materials

- *Calculus*, Briggs-Cochran, 3e, Inclusive Access

Prerequisites/Corequisites

- ACT 28–31 or SAT 640-700 or Next Gen AccuPlacer AAF 284-300

Course Objectives

1. State, motivate and interpret the definitions of continuity, the derivative, and the definite integral of a function, including an illustrative figure, and apply the definition to test for continuity and differentiability. In all cases, limits are computed using correct and clear notation. Student is able to interpret the derivative as an instantaneous rate of change, and the definite integral as an averaging process.
2. Use the derivative to graph functions, approximate functions, and solve optimization problems. In all cases, the work, including all necessary algebra, is shown clearly, concisely, in a well organized fashion. Graphs are neat and well-anotated, clearly indicating limiting behavior. English sentences summarize the main results and appropriate units are used for all dimensional applications.

3. Graph, differentiate, optimize, approximate and integrate functions containing parameters, and functions defined piecewise. Differentiate and approximate functions defined implicitly.
4. Apply tools from precalculus and trigonometry correctly in multi-step problems, such as basic geometric formulas, graphs of basic functions, and algebra to solve equations and inequalities.
5. State the main theorems of calculus correctly, including all conditions, and give examples of applications. These include the Intermediate Value Theorem, the Mean Value Theorem, the Extreme Value Theorem, and the Fundamental Theorem of Calculus.
6. Solve simple first and second order differential equations, either initial or boundary value problems, including problems where the derivative is given by a piecewise function, or when the initial value problem is described in words, such as in applications from physics, biology and engineering. Be familiar with the harmonic oscillator and describe period, amplitude, phaseshift of the trigonometric functions that appear.
7. Compute integrals using the method of substitution, including changing the bounds in the case of definite integrals.

UNM Administrative Mandate on Required Vaccinations

UNM requires COVID-19 vaccination and a booster for all students, faculty, and staff, or an approved exemption (see: UNM Administrative Mandate on Required Vaccinations). Proof of vaccination and booster, or a medical, religious, or online remote exemption, must be uploaded to the UNM vaccination verification site. Failure to provide this proof may result in a registration hold and/or disenrollment for students and disciplinary action for UNM employees.
Booster Requirement: Individuals who received their second dose of a Pfizer or Moderna vaccine on or before June 15, 2021, or their single dose of a Johnson & Johnson vaccine on or before October 15, 2021, must provide documentation of receipt of a booster dose no later than January 17, 2022.

Individuals who received their second dose of a Pfizer or Moderna vaccine after June 15, 2021 or who received their single dose of Johnson & Johnson after November 15, 2021 must provide documentation of receipt of a booster within four weeks of eligibility, according to the criteria provided by the FDA (6 months after completing an initial two-dose Moderna vaccine, 5 months after completing the Pfizer sequence, and 2 months after receiving a one-dose Johnson & Johnson vaccine).

International students: Consult with the Global Education Office.

Exemptions: Individuals who cannot yet obtain a booster due to illness should request a medical, religious, or online remote exemption (which may have an end date) and upload this to the UNM vaccination verification site.

Medical and religious exemptions validated in Fall 2021 (see your email confirmation) are also valid for Spring 2022 *unless an end date was specified in the granting of a limited medical exemption.* Students must apply for a remote online exemption every semester.

UNM Requirement on Masking in Indoor Spaces

ll students, staff, and instructors are required to wear face masks in indoor classes, labs, studios and meetings on UNM campuses, see the masking requirement. Students who do not wear a mask indoors on UNM campuses can expect to be asked to leave the classroom and to be dropped from a class if failure to wear a mask occurs more than once in that class. Students and employees who do not wear a mask in classrooms and other indoor public spaces on UNM campuses are subject to disciplinary actions. **Medical/health grade masks are the best protection against the omicron variant and these masks should be used, rather than cloth**.

Consequences of not wearing a mask properly

If you do not wear a mask, or if you do not wear a mask properly by covering your nose and mouth, you will be asked to leave class. If you fail to wear a mask properly on more than one occasion, you can expect to be dropped from the class. If you insist on remaining in the classroom while not wearing a mask, class will be dismissed for the day to protect others and you will be dropped from the class immediately.

Communication on change in modality

The President and Provost of UNM may direct that classes move to remote delivery at any time to preserve the health and safety of the students, instructor and community. Please check your email regularly for updates about our class and please check https://bringbackthepack.unm.edu regularly for general UNM updates about COVID-19 and the health of our community.

COVID-19 Symptoms and Positive Test Results

Please do not come to a UNM campus if you are experiencing symptoms of illness, or have received a positive COVID-19 test (even if you have no symptoms). Contact your instructors and let them know that you should not come to class due to symptoms or diagnosis. Students who need support addressing a health or personal event or crisis can find it at the Lobo Respect Advocacy Center, https://loborespect.unm.edu/.

Credit-hour statement

This is a four credit-hour course. Unless you are taking an evening section, class meets for three 50-minute sessions of direct instruction for fifteen weeks during the Fall 2021 semester. You will have a TR recitation section that meets for 1.25 hours a week as well. If you are taking an evening section (meeting MTR from 530-645PM) there is no recitation section. Students are expected to complete a minimum of six hours of out-of-class work (or homework, study, assignment completion, and class preparation) each week.

Grading Policy

Your grade will be based on the following:

- **Make Up Policy** No late assignments will be accepted without a university excused absence. No early/late quizzes or exams (including the final) will be given without a university excused absence. Please note that it is the students responsibility to drop the course if he/she stops submitting assignments. A failing grade of F may be issued if the student stops submitting the required assignments and does not drop before the posted deadline. No early final exams will be permitted except in documented emergencies: flight reservations, weddings, vacations, birthdays, non-NCAA sporting events etc. are not considered emergencies.
- **3 in-class exams** (100 points each).
- **Online Homework** (50 points) Online HW will be completed using MyMathLab. Your lowest two online HW scores will be dropped.
- **Written Homework** (50 points) Written HW will be assigned weekly. Your lowest two written HW scores will be dropped.
- **Quizzes** (50 points) There will be weekly quizzes with the lowest two scores dropped.
- **Final Exam** (200 points) The final exam will be given on Monday May 9th from 7:30-9:30 AM.
- To get full credit on graded work students must address all mathematical components presented by the problem, showing all steps and calculations. The use of proper notation, well-structured procedures, and legibility will be taken into account when assigning points.
- Grades will be assigned using the standard scale of 90-100: A; 80-89: B: 70-79: C; 60-69: D; $<$60: F

Course Policies

Attendance and Participation

Attendance and Participation: Attendance (mandatory) and engagement in the class (regular homework completion, questions/comments inside and outside class, and in office hours) are necessary to succeed in this course. If you need to miss class, please let your instructor know. Any unexplained and continued absences and lack of homework may lead to being withdrawn from the course. Please make sure to stay in touch with your instructor in case of special circumstances that temporarily prevent you from participating as needed.

Homework

You are encouraged and welcome to work together on the homework. However, the writeup you hand in must be your own work, in your own words. Referral to other sources outside of the material given in class (such as searching the web for answers) is strongly discouraged. It does not lead to understanding. To understand the material you have to work through it. You learn mathematics, just as you do the violin, or soccer, by practice, practice, practice. And just like playing the scales, or doing the dribbling skills, it is not necessarily always fun, but necessary. But do not bang your head in frustration! If you are totally stuck on a problem, contact your instructor or TA to help you get unstuck.

Student Behavior

All students have to abide by the Student Code of Conduct: https://pathfinder.unm.edu . According to the Code of Conduct, student activities that interfere with the rights of others to pursue their education or to conduct their University duties and responsibilities will lead to disciplinary action. The Department of Mathematics and Statistics requests that students practice netiquette during online lectures and discussions. We expect students to behave in a courteous and respectful manner toward the instructor and their fellow students.

Attendance is mandatory. First 3 Weeks Drop Policy: Within the first 3 weeks for 16-week courses (2 weeks for 8-week courses), if a student misses two classes and/or misses two assignments (homework/quizzes), the student may be dropped by the instructor. You are expected to be available during the scheduled class time. This is when you will take exams, quizzes and attend lectures and drop in hours. Please note that it is the student's responsibility to drop the course if he/she stops attending. A failing grade of F may be assigned if the student stops attending and does not drop before the posted deadline. **No early final exams** will be given except in documented emergencies: flight reservations, weddings, vacations, birthdays, non-NCAA sporting events etc. are not considered emergencies.

Extra Help

here are several resources to help you succeed in this class. Please consider your instructor your primary resource. Visit them during drop-in hours, ask questions inside and outside of class, let us know what difficulties you are having. We want to hear from you and we want to help you succeed. A list of all resources:
-Instructor Drop In Hours, availbility in and outside of class

-TAs office hours
-The Tutoring Table, staffed by appropriate instructors throughout the week (see posted schedule)
- CAPS: Center for Academic Program Support. Located on the 3rd floor of Zimmerman Library, caps.unm.edu, 505 277 7205
- SHAC: Counseling and Therapy Services, Student Health Center, shac.unm.edu, 505 277 3136. (For test anxiety, etc.)
-ESS Center: Engineering Student Success Center, www.ess.unm.edu, 505 277 4354

Academic Dishonesty

Academic dishonesty will be reported to the Dean of Students. Academic dishonesty includes copying answers from other sources to complete your homework and copying or looking at another student's exam or quiz while it is being given.

Exam Dates

All exam dates are given in the syllabus at the beginning of the semester. Exams cannot be rescheduled except in documented emergencies. If you need to reschedule because of a documented emergency (eg, surgery), please let your instructor know as soon as you find out. If you miss an exam, for example due to sickness, contact your instructor immediately. Do not schedule a personal trip during exams as you will not be given a makeup. Non-NCAA sporting events are also not university authorized emergencies.

Grading

One of the main goals of the course is to develop your mathematical writing skills, clearly showing all steps taken using correct algebra and notation. Therefore, your homework will be graded on the clarity and correctness of your mathematical presentation. Please take care to submit neat, legible solutions, with problems listed in order. Solutions that are hard to find or read will receive zero credit. The same standards will be applied to exams.

Grade Mode Change and Withdrawals

Deadlines to make changes to your registration status are published by the Office of the Registrar in the schedule of classes: http://registrar.unm.edu. To change grade mode or to withdraw after the deadlines posted therein, you need to 1) talk to your instructor to fully understand your standing in the class, and then 2) meet with your advisor and discuss the best path for you to proceed, as well as all consequences for your studies. Please ask your advisor to email your instructor, with copy to you, of the final decision. For grade mode changes you may also be required to have your instructor sign a grade mode change form: http://www.unm.edu/ unmreg/images/Forms/EnrlAuth-GradeMode.pdf , and your instructor will accommodate the change. Please note that to receive a W you need to withdraw by 5 pm on the Friday before final exams week.

Deadlines

The instructor will adhere to all of the deadlines published by the Office of the Registrar in the schedule of classes: http://registrar.unm.edu .

Last day to add class, change sections: January 28
Last day to change grade mode: January 28
Last day to drop without grade: February 4
Last day to drop without Dean's permission: April 15

Accommodations

Accessibility Resources Center (Mesa Vista Hall 20121, (505) 277-3506) provides academic support to students who have disabilities. If you think you need alternative accessible formats for undertaking and completing coursework, you should contact this service right away to assure your needs are met in a timely manner. If you need local assistance in contacting Accessibility Services reach out to advisor@math.unm.edu .

Title IX

Our classroom and our university should always be spaces of mutual respect, kindness, and support, without fear of discrimination, harassment, or violence. Should you ever need assistance or have concerns about incidents that violate this principle, please access the resources available to you on campus, especially the LoboRESPECT Advocacy Center and the support services listed on its website (http://loborespect.unm.edu/). Please note that, because UNM faculty, TAs, and GAs are considered "responsible employees" by the Department of Education, any disclosure of gender discrimination (including sexual harassment, sexual misconduct, and sexual violence) made to a faculty member, TA, or GA must be reported by that faculty member, TA, or GA to the university's Title IX coordinator. You can read the full campus policy regarding sexual misconduct at https://policy.unm.edu/university-policies/2000/2740.html .

Please note that we fully support the rights of everyone to an education in an environment of respect, support, and free from fear of deportation, and we strive to build such an environment. We will maintain confidentiality and work with students who require immigration-related accommodations. For more information and/or resources,

please contact the New Mexico Dream Team at info@nmdreamteam.org. For more information on the campus policy regarding sexual misconduct, see here.

Land Acknowledgement

Founded in 1889, the University of New Mexico sits on the traditional homelands of the Pueblo of Sandia. The original peoples of New Mexico Pueblo, Navajo, and Apache since time immemorial, have deep connections to the land and have made significant contributions to the broader community statewide. We honor the land itself and those who remain stewards of this land throughout the generations and also acknowledge our committed relationship to Indigenous peoples. We gratefully recognize our history.

Schedule and Weekly Learning Goals

This schedule is tentative and subject to change. The learning goals below should be viewed as the key concepts you should grasp after each week, and also as a study guide before each exam, and at the end of the semester. Each exam will test on the material that was taught up until the review day prior to the exam. The applications in the second half of the semester tend to build on the concepts in the first half of the semester though, so it is still important to review those concepts throughout the semester. The "Hand in" problems are to be turned in for a grade (Week 01 problems are turned in on Monday of Week 02 class, etc.). These problems are graded so that you can receive feedback regarding your understanding of concepts and use of notation. The "Self-Check" problems are odd problems in the book that test your basic knowledge of the material. It is imperative that you do **ALL** of the Self-Check problems as well. It may be tempting to skip the Self-Check Problems because they are not turned in. However, the primary goal of this course is to learn to solve problems and demonstrate that knowledge on exams, and the best way to accomplish this goal is by understanding all of the homework. The collected problems alone are not intended to give you enough practice to learn calculus, so if you ignore the Self-Check Problems, you will make the course far more difficult for yourself. The recitation quizzes, midterms, and final exam will be based on both sets of problems.

Week 01, 01/17 - 01/21: **No Class Monday**; §**2.1 Idea of Limits**; §**2.2 Definition of Limit**

- §**2.1** Self Check: 1-33; **Hand In**: 2, 6, 10, 12, 18, 22, 28
- §**2.2** Self Check: 1-33, 37-49; **Hand In**: 2, 4, 8, 10, 18, 20, 32, 40, 48
- Explain what $\lim_{x\to a} f(x) = L$ means. Illustrate with a sketch.
- Explain how left and right hand limits are related to the existence of a general limit.
- Give an example of a piecewise function $f(x)$ such that $\lim_{x\to 1} f(x) = 2$ but $\lim_{x\to 0} f(x)$ does not exist.
- Estimate $\lim_{x\to a} f(x)$ using a table.
- Use the slope of a secant line to determine the average velocity of a particle over a given interval.
- Use the limit of the secant slope to estimate the instantaneous velocity of a particle at a given time $t = a$.

Week 02, 01/24 - 01/28: §**2.3 Limit Laws**; §**2.4 Infinite Limits** §**2.5 Limits at Infinity**

- §**2.3** Self Check: 1-75; **Hand In**: 12, 16, 26, 30, 38, 40, 58, 72, 78, 88
- §**2.4** Self Check: 1-53; **Hand In**: 4, 8, 10, 14, 24, 28, 42, 44, 56
- §**2.5** Self Check: 1-57; **Hand In**: 8, 10, 16, 20, 26, 30, 34, 46, 56, 60
- Use proper notation when applying limit laws to calculate a limit (pay particular attention to your use of equal signs). Even if your answer is correct, you will lose points for incorrect notation.
- Give an example of a limit that cannot be evaluated using direct substitution but can be computed after an algebraic simplification.
- Determine when a limit exists or does not exist, algebraically and/or graphically.
- There are two ways we defined the slope of the tangent line to the graph of a function $f(x)$ at $x = a$. Be able to state both definitions and sketch a graph that illustrates how we obtain the slope of the tangent line from the slope of the secant line.
- Use limits to determine the vertical, horizontal, and slant asymptotes of rational functions.

Week 03, 01/31 - 02/04: §**2.6 Continuity**; §**3.1 Introduction to Derivative**

- §**2.6** Self Check: 1-65; **Hand In**: 6, 8, 16, 18, 22, 24, 28, 32, 36, 48, 58, 66
- §**3.1** Self Check: 1-47; **Hand In**: 6, 8, 14, 18, 28, 40, 48, 50, 54
- Use limits to determine the vertical, horizontal, and slant asymptotes of rational functions.
- Be able to define continuity of $f(x)$ at $x = a$.
- Determine where a function is continuous.
- State the two equivalent definitions of the derivative of $f(x)$ at a number $x = a$. Provide a physical example of what $f'(a)$ represents.

Week 04, 02/07 - 02/11: **Exam 1 on Thursday during recitation time**; §**3.2 Derivative as a Function**; §**3.3 Rules for Differentiation**

- §**3.2** Self Check: 1-39; **Hand In**: 10, 16, 18, 20, 22, 26, 28, 34, 44, 54
- §**3.3** Self Check: 1-59; **Hand In**: 14, 32, 36, 38, 42, 43, 48, 50, 68, 76, 78
- Use the graph of a function $f(x)$ to sketch the graph of $f'(x)$ (or vice versa).
- Give an example of a function that is not differentiable at $x = a$. Explain why.
- Know when and how to apply the power, sum/difference, product/quotient, and constant multiple rules.

Week 05, 02/14 - 02/18: §**3.4 Product and Quotient Rules**; §**3.5 Derivatives of Trigonometric Functions**; §**7.2 Derivative of the Exponential Function**;

- §**3.4** Self Check: 1-59; **Hand In**: 14, 18, 28, 38, 44, 52, 60, 64, 65, 66
- §**3.5** Self Check: 1-51; **Hand In**: 12, 14, 28, 32, 38, 46, 50, 56, 76, 78
- §**7.2** Self Check: 7-14, 31, 32, 80, 85; **Hand In**: 7-14, 31, 32, 80, 85 (same as Self Check)
- Be able to find the velocity and acceleration of a particle whose position at time t is modeled by any of the functions covered so far.
- Know when and how to apply the power, sum/difference, product/quotient, and constant multiple rules.
- Be able to find the velocity and acceleration of a particle whose position at time t is modeled by any of the functions covered so far.
- Know the derivatives of $\sin x$ and $\cos x$ and be able to derive the derivatives of $\sec x$, $\csc x$, $\tan x$, $\cot x$ using the quotient rule.
- Know the derivative of the exponential function.

Week 06, 02/21 - 02/25: §**3.6 Derivatives as Rates of Change**; §**3.7/7.2 Chain Rule**; §**3.8/7.2 Implicit Differentiation**

- §**3.6** Self Check: 1-27; **Hand In**: 6, 8, 12, 20, 22, 24, 36, 40
- §**3.7** Self Check: 1-71; **Hand In**: 10, 22, 24, 26, 28, 30, 40, 42, 54, 56, 68, 86
- §**7.2** Self Check: 31-39; **Hand In**: 31-37 all, 40, 77, 80, 84
- §**3.8** Self Check: 1-39; **Hand In**: 14, 20, 22, 36, 40, 42, 46, 56, 57
- Interpret the derivative as a rate of change in context, using appropriate units.
- Know when and how to apply the chain rule.
- Find the derivative of a relation using implicit differentiation and compute the line tangent to its graph at a given point.
- Give an example of a relation where computing dy/dx REQUIRES you to use implicit differentiation.
- Compute the derivative of a function of the form $f(x) = \frac{g(x)}{h(x)}$ using both the product rule AND the quotient rule.
- Interpret the derivative of a function at a point as the instantaneous rate of change in the quantity modeled and state its units.

Week 07, 02/28 - 03/04: §**3.9 Related Rates**; §**4.1 Maxima and Minima**

- §**3.9** Self Check: 1-27; **Hand In**: 10, 12, 14, 22, 24, 30, 36
- §**4.1** Self Check: 1-61, 71; **Hand In**: 16, 18, 26, 28, 30, 34, 44, 46, 52, 66, 71
- Set up and solve related rates problems.
- Use derivatives to find local and absolute extrema.

Week 08, 03/07 - 03/11: **Exam 2 on Thursday during recitation time**; §**4.2 Mean Value Theorem**; §**4.3 What Derivatives Tell Us**; §**4.4/7.2 Graphing Using Derivatives**

- §**4.2** Self Check: 1-6, 11-33; **Hand In**: 6, 8, 19, 30
- §**4.3** Self Check: 1-85 ; **Hand In**: 6, 10, 12, 16, 26, 30, 34, 48, 52, 54, 58, 60, 63, 72, 84
- §**4.4** Self Check: 1-47; **Hand In**: 8, 14, 22, 32, 36, 44, 48
- §**7.2** Self Check: 98, 99; **Hand In**: 98, 99
- State the Mean Value Theorem and illustrate the result geometrically.
- Use derivatives to find relative extrema, points of inflection, and intervals where the graph of a function is concave up or down.
- Use the first and second derivative tests to find extrema of functions.
- State the Extreme Value Theorem and use it to find the absolute extreme values of a function on a closed interval. Be able to draw a sketch that illustrates the theorem.

Week 09, 03/14 - 03/18: Spring Break Hooray!

Week 10, 03/21 - 03/25: §**4.5 Optimization**; §**4.6 Linear Approximation and Differentials**

- §**4.5** Self Check: 1-23; **Hand In**: 6, 10, 16, 20, 22, 40
- §**4.6** Self Check: 1-45; **Hand In**: 8, 12, 14, 22, 24, 26, 28, 36, 40, 50, 52, 56, 58
- Use derivatives to find relative extrema, points of inflection, and intervals where the graph of a function is concave up or down.
- Set up and solve optimization problems using a domain restriction appropriate in the context of the problem.
- Interpret the tangent line geometrically as the local linearization of a function.
- Use linearization/differentials to estimate an error that occurs because of approximation measurements in applications. For example, if the radius of a sphere is measured with a certain possible error in measurement, how will this effect the approximation of the volume of the sphere?

Week 11, 03/28 - 04/01: §**4.7 L'Hopital's Rule** ; §**4.9 Antiderivatives**

- §**4.7** Self Check: 1-59; **Hand In**: 8, 16, 20, 24, 26, 32, 34, 42, 58
- §**4.9** Self Check: 1-67; **Hand In**: 8, 24, 26, 36, 40, 42, 44, 46, 52, 66, 68, 80, 90
- Recognize when L'Hopital's rule is applicable and be able to apply it.
- State the definition of an antiderivative and give several examples involving algebraic, trigonometric, and exponential functions.
- Know the antiderivatives of b, x^n $(n \neq -1)$, $\sin(bx), \cos(bx), \sec^2(bx)$, $\sec(bx)\tan(bx)$, e^{bx} where b is any real number.
- Use antiderivatives to solve initial value problems and applications (including applications modeled by piecewise functions).

Week 12, 04/04 - 04/08: §**5.1 Approximating Areas**; §**5.2 Definite Integrals**

- §**5.1** Self Check: 1-35; **Hand In**: 4, 10, 12, 18, 34, 46, 48
- §**5.2** Self Check: 1-67; **Hand In**: 4, 6, 16, 26, 30, 34, 38, 42, 44, 48, 50, 58, 66
- Interpret the area under a curve in context, stating the units.
- Use left/right endpoints and midpoints to estimate the area under a curve. Identify whether or not an approximation is an overestimate or underestimate.
- Estimate the distance traveled by an object using a table of position/time values.
- State the definition of the definite integral and know its basic properties.
- Approximate the value of a definite integral using left/right endpoint and midpoint approximations.
- Compute the exact value of a definite integral using a Riemann sum. For example, $\int_0^1 (x^2 + 5)\, dx$

Week 13, 04/11 - 04/15: **Exam 3 Thursday during recitation time**; §**5.3 Fundamental Theorem Part 1**; §**5.3 Fundamental Theorem Part 2**; §**5.4 More Properties of Integrals**

- State and use the Fundamental Theorem of Calculus, Part 1 to find the derivative of a function defined as an integral. Be sure to know what conditions are required in order to apply the theorem!
- Interpret differentiation and antidifferentiation as inverse operations.
- Compute indefinite integrals of functions and explain why we add a constant when computing them.
- §**5.3 I** Self Check: 1-21; **Hand In**: 14, 18, 72, 74, 76, 80, 83, 85
- §**5.3 II** Self Check: 1-69; **Hand In**: 8, 26, 30, 34, 38, 40, 48, 56, 58, 60, 62, 68
- §**5.4** Self Check: 1-31; **Hand In**: 10, 14, 16, 20, 22, 24, 28, 36, 38, 44
- State and use the Fundamental Theorem of Calculus, Part 2 to find the exact value of a definite integral (this includes piecewise functions). Be sure to know what conditions are required in order to apply the theorem!

Exam 3 on Thursday during recitation time; §**5.5 Substitution (Definite Case)**; §**6.1 Velocity and Net Change**

Week 14, 04/18 - 04/22: §**5.5 Substitution (Indefinite Case)**; §**5.5 Substitution (Definite Case)**; §**6.1 Velocity and Net Change**

- §**5.5 Indefinite** Self Check: 1-15, 17-39; **Hand In**: 18, 20, 22, 24, 28, 30, 36, 38, 40, 74, 78
- §**7.2** Self Check: 51-56 all, 58, 59; **Hand In**: 51-56 all, 58, 59, 87
- §**5.5 Definite** Self Check: 41-71; **Hand In**: 42, 44, 46, 48, 52, 58, 62, 70, 86, 88, 92
- §**6.1** Self Check: 1-35; **Hand In**: 12, 16, 20, 24, 26, 27, 38, 42, 46
- §**7.2** Self Check: 88, 89; **Hand In**: 85, 87, 88
- Solve indefinite integrals using substitution and explain how the substitution rule works. Give several examples. item Solve definite integrals using the substitution rule. Change the limits of integration.
- State and apply the Net Change Theorem in context.
- Given the velocity of a particle over a time interval, compute the displacement and distance traveled. Explain the differences in how you compute displacement and distance traveled.

Week 15, 04/25 - 04/29: §**6.2 Area Between Curves**; §**6.3 Volumes of Solids of Revolution**

- §**6.2** Self Check: 1-49; **Hand In**: 6, 12, 18, 22, 26, 30, 34, 40, 48, 50, 54
- §**6.3** Self Check: 1-9, 17-57; **Hand In**: 8, 10, 18, 20, 34, 42, 46, 51, 54
- Sketch a region in the plane enclosed by two curves and determine the area of the region.
- Determine the volume of a solid of revolution (about a horizontal or vertical line) using the disk/washer method.

Week 16, 05/02 - 05/06: Catch Up and Review

Week 17, 05/09 - 05/13: Cumulative Final Exam on Monday May 9, 730-930 AM.