MATH 171  
Fall 2013  
Section TBA, Class Time: TBA, Location: TBA

Instructor Information:  
Instructor: Benjamin Aurispa  
Office Hours: TBA. Also by appointment  
Office: Blocker 630D  
E-mail: baurispa@math.tamu.edu. Please include your name and section number in any email you send me. Check your TAMU email account daily, because this is where class emails will be sent. You are responsible for any announcements made through email.  
Webpage: www.math.tamu.edu/~baurispa – Check regularly for announcements and important information, as well as for lecture notes, a course schedule, and other helpful links.

Required Materials:  

Calculator Policy: Calculators are not allowed on exams or quizzes, although they may be used on homework assignments.

Course Policies:  
Grading:  
<table>
<thead>
<tr>
<th></th>
<th>Weight</th>
<th>Final Grade Ranges</th>
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</thead>
<tbody>
<tr>
<td>Homework:</td>
<td>10%</td>
<td>90% ≤ A ≤ 100%</td>
</tr>
<tr>
<td>Quizzes:</td>
<td>15%</td>
<td>80% ≤ B &lt; 90%</td>
</tr>
<tr>
<td>3 In-Class Exams:</td>
<td>51%</td>
<td>70% ≤ C &lt; 80%</td>
</tr>
<tr>
<td>Final Exam:</td>
<td>24%</td>
<td>60% ≤ D &lt; 70%</td>
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Due to FERPA privacy issues, I cannot discuss grades over email or phone. If you have a question about your grade, please come see me in person.

Exams: There will be 3 in-class exams during the semester. Bring your Texas A&M student ID to all exams. The tentative material and dates for the exams are as follows:

- **Exam 1:** TBA  
  (Sections 1.1-1.3, 2.2-2.7, 3.1)
- **Exam 2:** TBA  
  (Sections 3.2, 3.4-3.11, 4.1-4.2)
- **Exam 3:** TBA  
  (Sections 4.3-4.4, 4.6, 4.8, 5.1-5.3, 5.5, 5.7, 6.1-6.2)

Final Exam: The final exam will be a cumulative (comprehensive) exam. The day and time of the final exam are determined by the university. The final will be on TBA.

Graded Homework: Homework assignments for a grade will be given about once a week. Homework assignments are due at the BEGINNING of class on the due date. Assignments turned in between 10 minutes after the start of class and the end of the day will receive a 10% penalty. Assignments turned in by the end of the next day will receive a 25% penalty. After this, no late work will be accepted.

Suggested Homework: Math cannot be learned by watching someone else do math. It requires a lot of practice. On my webpage there is a list of suggested homework. I STRONGLY suggest that you do these problems for more practice in addition to the graded homework. They will not be collected, but doing them to help you learn the material is very important.

Quizzes: There will be quizzes given weekly during your Tuesday class (except for exam weeks). The best way to prepare for these quizzes is to practice problems by doing the suggested homework. There may also be quizzes given periodically during other classes, either announced or unannounced, as well as take home quizzes.

Make-up Policy: Make-up exams and quizzes or late homework will NOT be allowed unless a University approved reason is given to me in writing. Notification before the absence is required when possible. Otherwise, you must notify me within 2 working days of the missed exam, quiz, or assignment to arrange a makeup. See University Student Rules for more guidelines. In all cases where an exam/quiz/assignment is missed due to an injury or illness, whether it be more or less than 3 days, I require a doctor’s note. Further, an absence due to a non-acute medical service or appointment (such as a regular checkup) is not an excused absence.

Providing a fake or falsified doctor's note is considered academic dishonesty, will be reported to the Aggie Honor Council, and will result in an F* in the course.
Grade Appeals: If you believe an error has been made in grading, you have until the next class period after the exam, quiz, or assignment has been handed back to let me know. Otherwise, you must accept the grade you received.

Help Session and Week in Review: Help sessions are come-and-go times where you can ask questions and get help with your homework from the student Help Session leaders. The Week in Review is a weekly session led by an instructor to review the topics of the previous week and to provide additional examples. On exam weeks, the Week in Review is an Exam Review. Although there are not Help Sessions and Week in Reviews directly for Math 171, please feel free to attend those for Math 151. See the links on my webpage for locations and times.

Other Sources of Help: There are streaming videos online with extra problems that you can take advantage of. There are also many past common exams and old Week in Review problem sets for Math 151 that you can additionally use to practice the material.

Classroom Respect: Please refrain from using electronic devices other than your calculator during class. Texting and playing on your phone or computer distracts not only you, but also those around you. If you would like to use a laptop during class to take notes with, please ask for permission prior to doing so.

Copyright: All printed handouts and web-materials are protected by US Copyright Laws. No multiple copies can be made without written permission by the instructor.

ADA Policy: The American with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu.

Academic Integrity Statement: Creating and other forms of academic dishonesty will not be tolerated. Please do not compromise your integrity for the sake of temporary benefits.

Aggie Honor Code: “An Aggie does not lie, cheat, or steal, or tolerate those who do.”

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements of the processes of the Honor System. For more information on academic integrity, see the Honor Council Rules and Procedures at http://www.tamu.edu/aggiethonor.

Note: As with any math class, it is very important that you keep up with the material and that you do not fall behind. Please don’t hesitate to ask questions in class, to come to my office hours, or to send me an e-mail. My goal is not to cram information into your head, but to help you learn. If you are not understanding the concepts, please ask for help. Don’t wait until the day before an exam to try and grasp the material. There are Help Sessions regularly as well as my office hours, streaming videos, and other materials online. Please take advantage of these resources.

Tentative Schedule:
- Week 1: 1.1 (Vectors), 1.2 (The Dot Product)
- Week 2: 1.2, 1.3 (Vector Functions), 2.2 (Limit of a Function)
- Week 3: 2.2, 2.3 (Calculating Limits Using Limit Laws), 2.4 (Precise Definition of a Limit), 2.5 (Continuity)
- Week 4: 2.6 (Limits at Infinity; Horizontal Asymptotes), 2.7 (Tangents, Velocities, and Other Rates of Change), 3.1 (Derivatives)
- Week 5: 3.2 (Differentiation Formulas), 3.4 (Derivatives of Trigonometric Functions), Exam 1
- Week 6: 3.4, 3.5 (The Chain Rule), 3.6 (Implicit Differentiation)
- Week 7: 3.7 (Derivatives of Vector Functions), 3.8 (Higher Derivatives), 3.9 (Slopes and Tangents of Parametric Curves), 3.10 (Related Rates)
- Week 8: 3.10, 3.11 (Differentials; Linear Approximations), 4.1 (Exponential Functions and Their Derivatives), 4.2 (Inverse Functions)
- Week 9: 4.2, 4.3 (Logarithmic Functions), 4.4 (Derivatives of Logarithmic Functions), Review, Exam 2
- Week 10: 4.4, 4.6 (Inverse Trigonometric Functions), 4.8 (Indeterminate Forms and L'Hopital's Rule), 5.1 (What does f' say about f?)
- Week 11: 5.2 (Maximum and Minimum Values), 5.3 (Derivatives and Shapes of Curves), 5.5 (Applied Maximum and Minimum Problems)
- Week 12: 5.5, 5.7 (Antiderivatives), 6.1 (Sigma Notation)
- Week 13: 6.1, 6.2 (Area)
- Week 14: 6.3 (The Definite Integral), 6.4 (The Fundamental Theorem of Calculus), Review, Exam 3
- Week 15: 6.4, Review
Catalog Description: Vectors, functions, limits, derivatives, Mean Value Theorem, applications of derivatives, integrals, Fundamental Theorem of Calculus. Designed to be more demanding than MATH 151. Prerequisite: MATH 150 or equivalent or acceptable score on TAMU Math Placement Exam. Credit will not be given for more than one of MATH 131, MATH 142, MATH 147, MATH 151 and MATH 171.

Learning Outcomes
This course focuses on quantitative literacy in mathematics along with real world applications to physics, related rate problems, and optimization. Upon successful completion of this course, students will be able to:

- Understand vectors and vector functions, both graphically and quantitatively, and apply them to real world situations involving velocity, forces, and work.
- Construct vector and parametric equations of lines and understand vector functions and their relationship to parametric equations.
- Understand the concept of a limit graphically, numerically, and algebraically, and apply the relationship between limits, continuity, and differentiability in determining where a function is continuous and/or differentiable.
- Conceptually understand the precise definition of a limit involving epsilon and delta.
- Define the limit definition of the derivative and calculate derivatives using the limit definition, differentiation formulas, the chain rule, and implicit differentiation, with applications to tangent line and velocity problems.
- Calculate limits and derivatives of vector functions with applications to physics such as computing velocity and acceleration vectors.
- Identify exponential, logarithmic, and inverse trigonometric functions, and compute limits and derivatives involving these classes of functions.
- Apply the derivative to mathematically model velocity and acceleration as well as real world related rate applications, such as calculating the rate at which the distance between two moving objects is changing or the rate at which the volume of a cone being filled with water is changing.
- Approximate functions and function values using the derivative and the tangent line.
- Identify and understand indeterminate forms and apply the derivative to calculate limits using L’Hospital’s Rule.
- Understand and apply the Intermediate Value Theorem and the Mean Value Theorem, and be able to logically determine when these theorems can be used.
- Use calculus and logic to sketch graphs of functions and analyze their properties, including where a function is increasing/decreasing and in describing the concavity of the function.
- Determine the maximum/minimum values of functions, including applied optimization problems.
- Compute antiderivatives and understand the concept of integration as it relates to area and Riemann sums.
- Articulate the relationship between derivatives and integrals using the Fundamental Theorem of Calculus, and evaluate definite integrals using the Fundamental Theorem of Calculus.
- Explain and/or prove various formulas or theorems used in the course.

Core Objectives
Critical Thinking

- Students will think critically about limits in determining how the limit conceptually relates to the behavior of the function.
- Students will analyze the limit of a function at a point using the precise definition of the limit.
- Students will think critically about continuity and differentiability to justify whether a function is continuous and/or differentiable at a point.
- Students will evaluate the proper technique to use when computing limits and derivatives of functions.
- Students will synthesize data determined from the first and second derivatives to determine the properties and shape of a function.
- Students will use inquiry to determine on what intervals a function is increasing/decreasing and to determine the intervals of concavity of the function by analyzing the signs of the first and second derivatives.
- Students will innovatively think about how to solve related rate word problems and optimization problems.
- Students will analyze functions using continuity and the derivative in determining the maximum and minimum values of the function, and if they exist.
- Students will develop a critical understanding of the relationship between the derivative and the integral using the Fundamental Theorem of Calculus.
**Communication Skills**

- Students will recognize and construct graphs of basic functions, including polynomials, exponential functions, logarithmic functions, and trigonometric functions.
- Students will justify solutions to optimization problems in writing.
- Students will interpret information from the derivatives of a function in order to develop a visual sketch of the graph of the function and to communicate in writing the properties of the function.
- Students will identify points of discontinuity and non-differentiability by examining the graphs of functions.
- Students will express mathematical concepts, such as the definition of the derivative, both abstractly with equations and in writing solutions to problems.
- Students will develop solutions to problems that involve the use of theorems, such as the Squeeze Theorem, the Intermediate Value Theorem, and the Mean Value Theorem.
- Students will use graphs of functions to determine the value of definite integrals as they relate to area.
- Students will be able to explain and/or prove various formulas or theorems used in the course.
- Students will communicate orally by answering questions in class and participating in any group discussion.

**Empirical and Quantitative Skills**

- Students will analyze limits numerically to determine the sign of the infinite limit.
- Students will analyze numerical data in determining the signs of the first and second derivative in order to make conclusions on the shape of the graph.
- Students will compute derivatives and interpret the results as they relate to tangent line, velocity, and other rate of change problems.
- Students will numerically approximate the values of a function by using the tangent line approximation.
- Students will calculate antiderivatives of functions and use initial data to determine any unknown constants.
- Students will make conclusions involving maximum and minimum values of functions (both local and absolute) based on information from the derivative.
- Students will manipulate given information to develop a function to be used in optimization problems and then apply calculus to find and interpret the optimal solution.
- Students will approximate the value of a definite integral numerically using Riemann sums.
- Students will compute definite integrals and interpret the results as they relate to area under a curve.
- Students will manipulate given information to create a related rate model involving known quantities, and then apply calculus to solve for an unknown rate of change.