

Math 170 – Calculus I

Fall 2015 Syllabus

Class Information

Instructor: Prof. Stephanie Blanda

Class Meeting: Section 01 – MTWF 8:00 – 9:05 am in HC M213
Section 02 – MTWF 2:15 – 3:20 pm in Zurn 213

Office: Old Main 400 (Tower)

Office Phone: (814) 824-2233

Office Hours:

Mon: 12:00 – 12:30pm (in the Advanced Lab) and 1:00 – 2:00pm

Tue: 10:00am – 12:00pm

Wed: 9:15 – 10:15am and 12:00 – 12:30pm (in the Advanced Lab)

Fri: 9:15 – 10:15am and 1:00 – 2:00 pm

Please note that the office (half) hours listed in green are held in the Advanced Lab instead of my office.

Email: sblanda002@gmail.com

Website: <http://sblanda.weebly.com/calculus-i-math-170.html>

Course Description

This first semester of calculus concentrates on the fundamentals of the derivative and its applications; tangent lines to curves; optimization problems; velocity and acceleration. There is also an introduction to integration with applications to geometry and physics.

Textbook

Calculus Early Transcendentals, Tenth Edition, by Anton, Bivens, and Davis. We will be covering chapters 0-5 in the textbook. No other supplies are required for the course.

Learning Objectives

There are two sets of learning objectives for this course. The first involves mastering the mathematical content (i.e. the "nuts and bolts") of differential and beginning integral calculus. On successful completion of the course, students should be able to:

- understand the concept of a limit from intuitive, graphical, and computational perspectives;
- have an intuitive understanding of a limit and be able to back up that understanding with graphical and computational perspectives;
- understand the definition of a derivative and the relationship between the various interpretations of it;
- understand conceptual relationships between derivatives, rates of change, and tangent lines;
- compute derivatives of functions using the definition of the derivative and then using the techniques and properties derived from the definition;
- know how to apply the derivative in problems involving optimization, curve sketching, and approximations;
- possess the capability to read a theorem in a calculus text, check the hypotheses in a particular situation, and draw appropriate conclusions.

The second set of goals involves broader issues of learning, such as:

- develop a sense for modeling physical situations in order to solve problems (Mathematics is the art of explanation);
- develop an appreciation for the beauty of mathematics, along with the problem solving skills that will be beneficial regardless of major;
- improve study habits necessary for continued success in your subsequent science and mathematics courses;
- improve algebra skills, thus the ability to express mathematical thoughts;
- clearly communicate mathematical ideas;
- engage in life-long learning.

Homework

When we finish a section in the book, you should immediately begin working on the homework problems from the list attached.

This "homework" will not be collected - it is designed to give you practice with the material we cover in class. Just as an athlete or musician must practice in order to improve, you as a math student must go through the repetition of homework problems in order to learn. Working through these problems will help you build up your math "strength" and is the key to your success in this class. You should plan to spend a significant amount of time on the homework. Expect to spend 2-3 hours working outside of class for every 1 hour of class instruction. Using this rule of thumb, you will likely be spending 8-12 hours per week studying the material outside our class meetings.

Make sure you keep up to date with the homework and ask questions if you are having trouble. Do not ignore a problem that you are struggling with. If you are having trouble with a topic, please come talk to me during office hours, ask questions in class, seek help from a classmate, or go to the department tutors for assistance. Don't wait until after the exam/the end of the semester when nothing can be done. You are expected to try to work on all problems on your own first - when coming to office hours, be prepared to show me what you've already tried.

Quizzes

Homework quizzes will be given according to the attached schedule, generally every Tuesday and Friday. These will be short quizzes and will be largely based on the suggested homework. **There are no make ups for the quizzes**, however the lowest two quiz grades will be dropped. Athletes or other individuals missing for school activities are to let me **before** missing a quiz. You **may not** use calculators, notes, electronic devices, the textbook, or any other materials when taking quizzes.

Quiz grades will not be based strictly on whether or not you found the correct answer. Your work must also be written clearly (and with proper notation) to receive full credit.

Midterm Exams

We will have three in class exams on the dates given below. You will be given an exact list of topics, along with a review sheet, approximately one week before each exam. You **may not** use calculators, notes, electronic devices, the textbook, or any other materials when taking exams.

Your lowest exam grade will be replaced by your final exam grade (if your final exam grade is the higher of the two). There are **no make up exams**. The grade for a missed exam will be replaced by your final exam grade. A second missed exam will receive a grade of 0, so please check your schedules carefully and ensure that you can attend all exams.

Exam Dates:

Wednesday, September 23rd
Friday, October 23rd
Wednesday, November 18th

Final Exam

The final exam will be **cumulative** and is scheduled for:

Wednesday, December 9, 8:00 – 10:00 am for **Section 1** (Class held MTWF 8:00-9:05am)
Friday, December 11, 1:00 – 3:00 pm for **Section 2** (Class held MTWF 2:15-3:20pm)

Final Grades

Grades will be calculated as follows:

- 50% – Average of 3 midterm exams (lowest replaced by final exam, if better)
- 20% – Average of homework quizzes (lowest two grades dropped)
- 30% – Final Exam

Your letter grade will be determined according to the department grading scale:

F	D	D+	C	C+	B	B+	A
0-59	60-64	65-69	70-77	78-83	84-89	90-93	94-100

Quiz and exam grades will be posted on Blackboard so you can keep track of your progress throughout the semester.

Tutoring

The Department of Mathematics offers free tutoring for Calculus I students in Zurn 213. No appointments are necessary, just drop by any time between 6:00 – 8:00 PM on Sunday, Monday, Tuesday, or Thursday. You can ask tutors any questions you may have, including questions on assigned homework and exam review sheets. Please visit <http://math.mercyhurst.edu/~griff/courses/Tutoring/> for more information.

Piazza

In order to sign up for Piazza, please use the following link:

<https://piazza.com/mercyhurst/fall2015/math170/home>

You can think of the Piazza page as a discussion forum - the Piazza page will allow you to ask questions about homework and interact with me and your fellow classmates. You can even answer questions posted by your peers. Be sure to sign up and check it regularly as the semester progresses. If you have any difficulties joining our Piazza page, please let me know.

Other Information

1. The only required material for the course is the textbook. Graphing calculators and mathematical software can be used to check your work, but should not be relied on to do the work for you.
2. I guarantee that I will return emails within 24 hours. However, it is generally better to ask complicated questions during class, in office hours, or on Piazza. If you have a question about the homework, it is very likely your classmates have the same question, so you're doing the class a favor by asking!
3. I do not keep detailed lecture notes. It is highly recommended that you establish contacts among your classmates to get notes in case you miss class.
4. Attendance is not required, but coming to class regularly will generally improve your grade. You are responsible for any material covered in your absence (I will not teach it to you separately during office hours). Please contact me if you are absent for an extended period of time.
5. Calling my office phone is rarely the best way to get in touch with me. Email is the fastest way to contact me outside of office hours.

Support of the Mercy Mission

This course supports the mission of Mercyhurst University by creating students who are intellectually creative. Students will foster this creativity by: applying critical thinking and qualitative reasoning techniques to new disciplines; developing, analyzing, and synthesizing scientific ideas; and learning and applying a problem solving process.

Learning Differences

In keeping with college policy, any student with a disability who needs academic accommodations must call the Learning Differences Program secretary at 824-3017 to arrange a confidential appointment with the director of the Learning Differences Program during the first week of classes.

Math 170 Calculus I – Fall 2015 Course Schedule

Date	Topic	Quiz
Week 1		
Aug. 26	Class Introduction	
Aug. 28	0.1 Functions	
Week 2		
Aug. 31	0.2 New Functions from Old	
Sept. 1	0.3 Families of Functions	Quiz 1 on Section 0.1
Sept. 2	0.4 Inverse Functions; Inverse Trig Functions	
Sept. 4	0.5 Exponential and Logarithmic Functions	Quiz 2 on Sections 0.2 & 0.3
Week 3		
Sept. 7	No Class – Labor Day	
Sept. 8	1.1 Limits (An Intuitive Approach)	Quiz 3 on Sections 0.4 and 0.5
Sept. 9	1.2 Computing Limits	
Sept. 11	1.3 Limits at Infinity; End Behavior of a Function	Quiz 4 on Section 1.1
Week 4		
Sept. 14	1.3 Limits at Infinity; End Behavior of a Function	
Sept. 15	1.4 Limits (Discussed More Rigorously)	Quiz 5 on Sections 1.2 and 1.3
Sept. 16	1.5 Continuity	
Sept. 18	1.5 Continuity	Quiz 6 on Sections 1.3 and 1.4
Week 5		
Sept. 21	1.6 Continuity of Trig, Exponential, and Inverse Functions	
Sept. 22	Review for Exam I	Quiz 7 on Section 1.5 and 1.6
Sept. 23	Exam I (Chapters 0 and 1)	
Sept. 25	2.1 Tangent Lines and Rates of Change	
Week 6		
Sept. 28	2.2 The Derivative Function	
Sept. 29	2.3 Introduction to Techniques of Differentiation	Quiz 8 on Section 2.1
Sept. 30	2.4 The Product and Quotient Rules	
Oct. 2	2.5 Derivatives of Trig Functions	Quiz 9 on Sections 2.2 and 2.3
Week 7		
Oct. 5	2.6 The Chain Rule	
Oct. 6	3.1 Implicit Differentiation	Quiz 10 on Sections 2.4 and 2.5
Oct. 7	3.2 Derivatives of Logarithmic Functions	
Oct. 9	3.3 Derivatives of Exponential and Inverse Trig Functions	Quiz 11 on Sections 2.6 and 3.1
Week 8		
Oct. 12	3.4 Related Rates	
Oct. 13	3.4 Related Rates	Quiz 12 on Sections 3.2 and 3.3
Oct. 14	3.5 Local Linear Approximation	
Oct. 16	No Class – Mid-Semester Break	

Week 9		
Oct. 19	3.6 L'Hôpital's Rule; Indeterminate Forms	
Oct. 20	3.6 L'Hôpital's Rule; Indeterminate Forms	Quiz 13 on Sections 3.4 and 3.5
Oct. 21	Review for Exam II	
Oct. 23	Exam II (Chapters 2 and 3)	
Week 10		
Oct. 26	4.1 Increase, Decrease, and Concavity	
Oct. 27	4.2 Relative Extrema; Graphing Polynomials	Quiz 14 on Section 3.6
Oct. 28	4.3 Rational Functions, Cusps, and Vertical Tangents	
Oct. 30	4.3 Rational Functions, Cusps, and Vertical Tangents	Quiz 15 on Sections 4.1 and 4.2
Week 11		
Nov. 2	4.4 Absolute Maxima and Minima	
Nov. 3	4.5 Applied Maximum and Minimum Problems	Quiz 16 on Section 4.3
Nov. 4	4.5 Applied Maximum and Minimum Problems	
Nov. 6	4.6 Rectilinear Motion & 4.7 Newton's Method	Quiz 17 on Sections 4.4 and 4.5
Week 12		
Nov. 9	4.8 Rolle's Theorem; Mean Value Theorem	
Nov. 10	5.1 An Overview of the Area Problem	Quiz 18 on Sections 4.5 and 4.6
Nov. 11	5.2 The Indefinite Integral	
Nov. 13	5.3 Integration by Substitution	Quiz 19 on Sections 4.8 and 5.1
Week 13		
Nov. 16	5.3 Integration by Substitution	
Nov. 17	Review for Exam III	Quiz 20 on Sections 5.2 and 5.3
Nov. 18	Exam III (Sections 4.1, 4.2, 4.3, 4.4, 4.5, 4.8, 5.1, 5.2, and 5.3)	
Nov. 20	5.5 The Definite Integral	
November 23 – November 27		
	No Class – Thanksgiving Break	
Week 14		
Nov. 30	5.6 The Fundamental Theorem of Calculus	
Dec. 1	5.7 Rectilinear Motion Revisited	Quiz 21 on Section 5.5 and 5.6
Dec. 2	5.9 Evaluating Definite Integrals by Substitution	
Dec. 4	Review for Final Exam	Quiz 22 on Sections 5.7 and 5.9
Final Exam Week		
Dec. 9	Final Exam for Section 1 (Class held MTWF 8:00-9:05am)	8:00 – 10:00 am
Dec. 11	Final Exam for Section 2 (Class held (MTWF 2:15-3:20pm)	1:00 – 3:00 pm

Math 170 Calculus I – Fall 2015 Homework Assignments

Note: Numbers always refer to problems in the "Exercise Set" portion, not the "Quick Check Exercises."

Section	Page	Problems
0.1	12	1, 3, 4, 5, 6, 15, 19, 23, 27, 31a-c
0.2	24	1, 3, 5, 11, 13, 17, 25, 27, 29, 31, 33, 35, 39, 41, 49
0.3	35	1, 3, 11, 15, 17, 19, 25, 29, 31
0.4	48	1, 9, 13, 17, 19, 25, 27, 31
0.5	61	1, 5, 9, 11, 13, 15, 17, 21, 23, 25, 27, 47
1.1	77	1, 3, 5, 7, 9, 21, 23, 25
1.2	87	1, 3, 7, 11, 13, 15, 19, 21, 25, 31
1.3	96	1, 3, 5, 9, 13, 15, 21, 31, 33, 37, 43
1.4	106	You are not responsible for this section (but try #17 and #21 anyway!)
1.5	118	1, 3, 5, 7, 11, 17, 21, 29, 35
1.6	125	1, 7, 9, 13, 21, 23, 27, 31, 37, 67
2.1	141	3, 11, 13, 15, 17, 13
2.2	152	1, 3, 7, 9, 11, 21, 23, 29
2.3	161	1, 3, 5, 7, 9, 13, 15, 17, 21, 41, 43
2.4	168	1, 3, 5, 7, 11, 13, 19, 31, 33
2.5	172	1, 5, 11, 15, 17, 21, 27
2.6	178	3, 7, 11, 15, 17, 19, 23, 35, 37, 39
3.1	190	3, 5, 7, 9, 11, 13, 15, 17
3.2	195	1, 3, 7, 13, 19, 23, 25, 35, 37, 41
3.3	201	15, 17, 19, 21, 23, 37, 43, 51, 65
3.4	208	1, 5, 13, 15, 17, 19
3.5	217	3, 5, 7, 23, 29
3.6	226	1, 7, 11, 13, 17, 21, 23, 47
4.1	241	1, 5, 7, 15, 19, 21, 29, 39
4.2	252	3, 5, 7, 9, 11, 19, 25, 29, 33, 37, 41, 45
4.3	264	1, 3, 9, 13, 25
4.4	272	3, 7, 9, 13, 21, 23, 25, 27
4.5	283	3, 5, 13, 19, 21, 31, 37
4.6	294	1, 3, 17, 19
4.8	308	1, 3, 5, 7, 15, 25
5.1	321	13, 15, 17
5.2	330	9, 11, 13, 15, 17, 19, 21, 23, 27, 43, 45
5.3	338	1, 3, 7, 9, 15, 17, 21, 23, 27, 31, 33, 41, 47
5.5	360	13, 15, 19, 21, 23
5.6	373	7, 9, 13, 17, 19, 23, 29, 31
5.7	381	5, 9, 13, 17
5.9	393	1, 5, 9, 15, 31, 33, 37, 43, 49

Mercyhurst University – CORE Curriculum

Category V - Scientific, Quantitative, and Critical Reasoning

MATH 170 – Fall 2015

Stephanie Blanda, Assistant Professor, sblanda@mercyhurst.edu

This course has been approved for the Mercyhurst University Core and fulfills a requirement in Core Area V. The following explicates the Core Learning Outcomes that are associated with this course and how they will be assessed as part of the Core requirements.

Core Learning Outcomes and Assessment Strategies

The table below highlights the Student Learning Outcomes associated with every course in *Core Area V - Scientific, Quantitative, and Critical Reasoning*.

Primary Learning Outcome	Learning Objective	Associated Assessment
Quantitative and Scientific Reasoning	Use mathematical concepts to make logically sound decisions, judgments, and/or predictions; effectively use scientific inquiry and reasoning to solve problems and analyze and interpret data.	Quantitative conceptual evaluation, issued online to all student enrolled in an relevant course

All Core Student Learning Outcomes are assessed on a rotating basis of at least once every three years. All assessment documents and information including the scoring rubrics can be found on the Mercyhurst portal and website. Please direct questions to the course professor or to the Core Assessment Coordinator – coreassessment@mercyhurst.edu.

Course Learning Goals and Objectives





Supporting Learning Outcome

Critical Thinking

Supporting Learning Outcome

Creative Thinking

The following course objectives detail how the specific content of this course will support the above Core Outcomes.

-  Understand the concept of a limit from intuitive, graphical, and computational perspectives
-  Compute derivatives of functions using the definition of the derivative and then using the techniques and properties derived from the definition
-  Know how to apply the derivative in problems involving optimization, curve sketching, and approximations
-  Possess the capability to read a theorem in a calculus text, check the hypotheses in a particular situation, and draw appropriate conclusions