

**MATH 153: CALCULUS 1A WITH PRECALCULUS
FALL 2016**

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Text: *Calculus, Stewart, Eighth Edition, Early Transcendentals*

Pre-requisites: Credit for Math 126 and Math 128 or satisfactory performance on the placement test.

About Math 153: This is the first part of a two-semester introduction to calculus covering functions, rates of change and differentiation as well as accumulation and integration. The course will study algebra and trigonometry as needed for the development of calculus concepts. More time will be spent in this course on the details of algebraic manipulation and the underlying algebra and trigonometry than in the one semester Math 155 course. At most 10 credit hours towards fulfilling objective 2 of the General Education Curriculum may be counted from the courses Math 126, 128, 129, 153, 154, and 155.

Math 153 and Math 154: As part of the General Education Foundations (GEF) curriculum, these combined courses incorporate GEF Learning Goals in addition to the specific learning outcomes for this course.

GEF Learning Goal 2: *GEF courses should teach at least one intellectual or practical skill relevant for modern life, and explicitly describe to students what it is and where it is applicable.*

- Analyze a problem and select an appropriate solution strategy.
- Compare and contrast multiple solution methods to determine accuracy and efficiency.
- Effectively communicate mathematical ideas and solutions in written and oral form

GEF Learning Goal 4: *GEF courses should allow for the integration and synthesis of knowledge across disciplines, and courses should explicitly explain the connection of knowledge across disciplines.*

- Use mathematics to model real-world situations and to solve relevant problems from other disciplines (e.g. physics, engineering, biology, etc.)

Additional Learning Outcomes

- Limits
 - Evaluate limits graphically.
 - Evaluate limits algebraically using a variety of methods (L'Hospital's Rule, factor/cancel, etc.).
 - Approximate limits when necessary (and determine when an approximation is necessary).
- Derivatives
 - Evaluate derivatives symbolically and graphically.
 - Distinguish between average and instantaneous rate of change (symbolically, within the context of an application problem, and graphically as slopes of tangent/secant lines).
 - Explain the role of the limit in the concept of a derivative.
 - Memorize and correctly apply derivative rules (power, product, quotient, chain, etc.).
 - Compare and contrast solution methods to derivative problems to determine efficient methods.
 - Analyze the behavior of $f(x)$, based on information about $f'(x)$ and $f''(x)$.
 - Use derivatives to solve application problems (optimization, related rates, etc.)
- Definite Integrals

- Explain the role of the limit in the context of the definite integral
- Memorize and correctly apply antiderivative rules
- Evaluate Riemann sums numerically (within the context of an application problem) and graphically (as a representation of area).
- Evaluate definite integrals using the Fundamental Theorem of Calculus and area under a curve.
- Explain why area under a curve is a representation of a definite integral.

To accomplish these goals requires active student learning, not passive participation. Attendance is required and you will be required to engage in class activities as determined by your instructor. Most of these will be based on exercises from the text in your online homework system. These are intended to promote discussion of mathematical concepts and modeling and you are encouraged to share your ideas.

Evaluation: Each semester, multiple forms of assessment will be used to measure your understanding of the concepts, skills, problem-solving, and critical thinking abilities. The distribution of these assessments in a given semester is:

Assessment	Points
WebAssign Homework Sets	80
Lab Assignments	80
Attendance/Participation	40
Hour Exams	400
Comprehensive Final Exam	200
Total	800

Grading Scale: Standard University grading scale applies based on overall weighted averages.

A	90-100%
B	80-90%
C	70-80%
D	60-70%
F	<60%

Attendance/Participation/Activities: Your instructor will determine the attendance/participation/activities portion that counts as 5% of your overall grade. There is a high reward for attending this class on a regular basis.

You are required to bring your WVU student ID to every class and exam to verify attendance.

WebAssign Homework Sets: Homework assignments will be given regularly at www.webassign.net and will be worth 10% of your overall grade. Each student will need to register for a WebAssign account, and additional information will be provided on how to do so.

Lab Worksheets or Online Labs: Worksheets or Online Labs will be given in the IML Computer Lab (room 421/215 Armstrong Hall) each Thursday (unless an exam is scheduled for that day) and will be

worth 10% of your overall grade. **Your attendance in lab is required** and you will not get credit for the lab unless you are there to do it. One make-up lab will be given at the end of the semester. Bring your **HEADPHONES** to lab if you are doing the online labs.

Exams: Four major exams will be given during the semester. Each exam will be approximately 1 hour in length and be given in the lab on Thursdays. A comprehensive final will be given at the end of the term. This exam will be common to all sections and will be graded by all instructors of the course.

Makeup Exam Policy: If you miss an exam FOR ANY REASON in Math 153, you will be allowed to take a COMPREHENSIVE makeup exam at the end of the semester. You may not make up more than one exam. In other words, if you miss one exam during the semester, this makeup exam may be used to make up that exam. If you miss more than one, you will receive a zero for any additional missed exams beyond the first missed exam.

Technology: Grades will be reported within WVU eCampus at ecampus.wvu.edu so students should be familiar with that system. Some instructors may communicate via MiX and eCampus as well.

Calculators: You will be allowed to use the scientific calculator on the computer on exams for Math 153.

Academic Dishonesty: Plagiarism, cheating, dishonesty, forgery, misrepresentation, fraud, et al., fall into this category. They will not be tolerated. Please see <http://www.arc.wvu.edu/admissions/integrity.html> for a full description of WVU's policies regarding this subject. In this class, the first offense may result in a lower grade or zero on the assessment. The second offense will result in a zero for the assessment and referral to student affairs and the academic dean's office.

West Virginia University is committed to **social justice**. I concur with that commitment and expect to foster a nurturing learning environment based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration.

The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Accessibility Services (293-6700). For more information on West Virginia University's Diversity, Equity, and Inclusion initiatives, please see <http://diversity.wvu.edu> .

Week	Session	Section	Topic	WebAssign Check Off
8/17	1	Intro/ 1.1	Representing Functions	
	2	1.1/1.2	Representing Functions	
8/22	1	1.2	Essential Functions	
	2	1.2	Trig Review	
	3	1.2/1.3	Trig Review	
8/29	1	1.3	Transformations of Functions	
	2	1.4	Exponential Functions	
	3	1.5	Inverse Functions/Logarithms	
9/5	1		No Class – LABOR DAY	
	2		Review for Exam 1	
	3	2.1	Exam 1 Tangent and Velocity Problems	
9/12	1	2.2	The Limit Concept	
	2	2.3	Calculating Limits	
	3	2.3	Calculating Limits	
9/19	1	2.4	The Precise Definition of a Limit	
	2	2.5	Continuity	
	3	2.5/2.6	Continuity/Limits at Infinity	
9/26	1	2.6	Limits at Infinity	
	2		Review for Exam 2	
	3	2.7/2.8	Exam 2 Definition of the Derivative	
10/3	1	2.7/2.8	Definition of the Derivative	
	2	2.7/2.8	Definition of the Derivative	
	3	3.1	Derivatives of Polynomials	
10/10		3.1	Derivatives of Exponential Functions	
	1	3.2	Product Rule	
	2	3.2	Quotient Rule	
10/17	1	3.3	Trig Derivatives	
	2		Review for Exam 3	
	3	3.4	Exam 3 Chain Rule	
10/24	1	3.4	Chain Rule	
	2	3.4	Chain Rule	
	3	3.5	Implicit Differentiation	
10/31	1	3.5	Implicit Differentiation	
	2	3.6	Derivatives of Log Functions	
	3	3.6	Logarithmic Differentiation	
11/7	1	3.7	Applications to Natural/Social Sciences	
	2	3.7/3.8	Exponential Growth/Decay	
	3	3.8	Exponential Growth/Decay	
11/14	1	3.8	Exponential Growth/Decay	
	2		Review for Exam 4	
	3		Exam #4 Review for Final	
FALL BREAK!!!!!!				
11/28	1		Review for Final	
	2		Review for Final	
	3		Review for Final	
12/5	1		Review for Final	
			Final Exam	