

# COURSE CHANGE FORM

Complete 1a – 1f & 2a – 2c. Fill out the remainder of the form as applicable for items being changed.

<b>1. General Information.</b>					
a.	Submitted by the College of: <u>Arts &amp; Sciences</u>	Today's Date: <u>10/28/2011</u>			
b.	Department/Division: <u>Department of Mathematics</u>				
c.	Is there a change in "ownership" of the course?			YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
	If YES, what college/department will offer the course instead? _____				
d.	What type of change is being proposed?	<input checked="" type="checkbox"/> Major	<input type="checkbox"/> Minor <sup>1</sup>	(place cursor here for minor change[OSC1] definition)	
e.	Contact Person Name: <u>David Royster</u>	Email: <u>dcro223@uky.edu</u>	Phone: <u>71258</u>		
f.	Requested Effective Date: <input checked="" type="checkbox"/> Semester Following Approval	OR	<input type="checkbox"/> Specific Term <sup>2</sup> :	_____	
<b>2. Designation and Description of Proposed Course.</b>					
a.	Current Prefix and Number: <u>MA 123</u>	Proposed Prefix & Number:	_____		
b.	Full Title: <u>Elementary Calculus and its Applications</u>	Proposed Title:	_____		
c.	Current Transcript Title (if full title is more than 40 characters): _____				
c.	Proposed Transcript Title (if full title is more than 40 characters): _____				
d.	Current Cross-listing: <input checked="" type="checkbox"/> N/A	OR	Currently <sup>3</sup> Cross-listed with (Prefix & Number):	_____	
	Proposed – <input type="checkbox"/> ADD <sup>3</sup> Cross-listing (Prefix & Number): _____				
	Proposed – <input type="checkbox"/> REMOVE <sup>3,4</sup> Cross-listing (Prefix & Number): _____				
e.	<b>Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours<sup>5</sup> for each meeting pattern type.</b>				
Current:	<u>3</u> Lecture	_____ Laboratory <sup>5</sup>	_____ Recitation	_____ Discussion	_____ Indep. Study
	_____ Clinical	_____ Colloquium	_____ Practicum	_____ Research	_____ Residency
	_____ Seminar	_____ Studio	_____ Other – Please explain: _____		
Proposed:	<u>3</u> Lecture	_____ Laboratory	<u>1</u> Recitation	_____ Discussion	_____ Indep. Study
	_____ Clinical	_____ Colloquium	_____ Practicum	_____ Research	_____ Residency
	_____ Seminar	_____ Studio	_____ Other – Please explain: _____		
f.	Current Grading System:	<input checked="" type="checkbox"/> Letter (A, B, C, etc.)	<input type="checkbox"/> Pass/Fail		
	Proposed Grading System:	<input type="checkbox"/> Letter (A, B, C, etc.)	<input type="checkbox"/> Pass/Fail		
g.	Current number of credit hours: <u>3</u>	Proposed number of credit hours: <u>4</u>			

<sup>1</sup> See comment description regarding minor course change. *Minor changes are sent directly from dean's office to Senate Council Chair.* If Chair deems the change as "not minor," the form will be sent to appropriate academic Council for normal processing and contact person is informed.

<sup>2</sup> Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.

<sup>3</sup> Signature of the chair of the cross-listing department is required on the Signature Routing Log.

<sup>4</sup> Removing a cross-listing does not drop the other course – it merely unlinks the two courses.

<sup>5</sup> Generally, undergrad courses are developed such that one semester hr of credit represents 1 hr of classroom meeting per wk for a semester, exclusive of any lab meeting. Lab meeting generally represents at least two hrs per wk for a semester for 1 credit hour. (See SR 5.2.1.)

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<b>h.</b>	<b>Currently, is this course repeatable for additional credit?</b>	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
	<i>Proposed to be repeatable for additional credit?</i>	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
	<i>If YES: Maximum number of credit hours:</i> _____		
	<i>If YES: Will this course allow multiple registrations during the same semester?</i>	YES <input type="checkbox"/>	NO <input type="checkbox"/>
<b>i.</b>	<b>Current Course Description for Bulletin:</b>	<u>An introduction to differential and integral calculus, with applications to business and the biological and physical sciences. Not open to students who have credit in MA 113. Prereq: Math ACT score of 26 or above, or Math SAT of 600 or above, or MA 109, or appropriate.</u>	
	<i>Proposed Course Description for Bulletin:</i> _____		
<b>j.</b>	<b>Current Prerequisites, if any:</b>	<u>Math ACT score of 26 or above, or math SAT of 600 or above, or MA 109, or appropriate.</u>	
	<i>Proposed Prerequisites, if any:</i> _____		
<b>k.</b>	<b>Current Distance Learning(DL) Status:</b>	<input type="checkbox"/> N/A <input checked="" type="checkbox"/> Already approved for DL* <input type="checkbox"/> Please Add <sup>6</sup> <input type="checkbox"/> Please Drop	
	*If already approved for DL, the Distance Learning Form must also be submitted <u>unless</u> the department affirms (by checking this box <input checked="" type="checkbox"/> ) that the proposed changes do not affect DL delivery.		
<b>l.</b>	<b>Current Supplementary Teaching Component, if any:</b>	<input type="checkbox"/> Community-Based Experience <input type="checkbox"/> Service Learning <input type="checkbox"/> Both	
	<i>Proposed Supplementary Teaching Component:</i>	<input type="checkbox"/> Community-Based Experience <input type="checkbox"/> Service Learning <input type="checkbox"/> Both	
<b>3.</b>	<b>Currently, is this course taught off campus?</b>	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
	<i>Proposed to be taught off campus?</i>	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
<b>4.</b>	<b>Are significant changes in content/teaching objectives of the course being proposed?</b>	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
	If YES, explain and offer brief rationale:		
	<p><u>The proposed mode of instructional delivery and increased credit hours reflect changes made to MA 123 to increase student success and support UK Core, the Provost's initiative to reform and restructure general education at the University of Kentucky.</u></p> <p><u>Increasing Student Success. Ma 123 is taught in large lecture classes generally with 150 - 200 students in each lecture. We feel that the students need smaller recitation sections so that they can receive more individual attention and so that there is a small class setting where homework problems and course material can be discussed in more detail. The newly created recitation sections are well structured. Students are required to work through a 30 page packet provided online without cost to the students.</u></p> <p><u>In Spring 2011, Ma 123 was offered in two formats. Sections 1-24 consisted of large lecture classes with recitations, enrolling a total of 694 students with a DEW rate of 24.6%. Sections 25, 26 consisted of large lectures and no recitations, enrolling a total of 297 students with a DEW rate of 33.3%. Since the 75 minute recitation had a clear impact on student success, it is proposed to offer the course with three lectures and one recitation for all sections.</u></p> <p><u>Supporting the UK Core. Beginning in Fall 2011, Math 123 is now a UK Core course, which requires two written projects: (1) an EXCEL spreadsheet project which requires students to estimate derivatives numerically and interpret the data and (2) a project in which students compare the results of exponential and logistics models for population growth and critique the results of each model. Students are required to use library resources in order to obtain data on the world population to test the models, and to research other predictions of future population growth in order to further evaluate the two models.</u></p>		

<sup>6</sup> You must *also* submit the Distance Learning Form in order for the course to be considered for DL delivery.

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<p><u>The written projects may be found at <a href="http://www.math.uky.edu/~ma123/Fall11/written.html">http://www.math.uky.edu/~ma123/Fall11/written.html</a></u></p> <p><u>Use of Excel spreadsheets is consistent with MAA CRAFTY project guidelines, which recommend that any course targeted for business or biology students should have a spreadsheet component.</u></p> <p><u>Students are also required to work through a 30 page packet of worksheets including discovery exercises which anticipate new ideas and concepts introduced during the term. The worksheet packet may be found at <a href="http://www.math.uky.edu/~ma123/Fall11/worksheets.html">http://www.math.uky.edu/~ma123/Fall11/worksheets.html</a>.</u></p> <p><u>The three-lecture format is needed to give in-depth coverage of course material. The recitation provides an opportunity to develop students' computational skills and conceptual understanding, and to provide guidance on the written projects.</u></p>		
<b>5. Course Relationship to Program(s).</b>		
<b>a.</b>	<b>Are there other depts and/or pgms that could be affected by the proposed change?</b>	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
If YES, identify the depts. and/or pgms: <u>Dept of Biology, Gatton College of Business, College of Agriculture</u>		
<b>b.</b>	<b>Will modifying this course result in a new requirement<sup>7</sup> for ANY program?</b>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
If YES <sup>7</sup> , list the program(s) here: _____		
<b>6. Information to be Placed on Syllabus.</b>		
<b>a.</b>	<input type="checkbox"/> Check box if <u>changed to</u> 400G or 500.	If <u>changed to</u> 400G- or 500-level course you must send in a syllabus and <i>you must include the differentiation</i> between undergraduate and graduate students by: (i) requiring additional assignments by the graduate students; and/or (ii) establishing different grading criteria in the course for graduate students. (See SR 3.1.4.)

<sup>7</sup> In order to change a program, a program change form must also be submitted.

# COURSE CHANGE FORM

## Signature Routing Log

### General Information:

Course Prefix and Number: MA 123 (chg mtg pattern, increase cr hrs)

Proposal Contact Person Name: David Royster Phone: 71258 Email: dcro223@uky.edu

### INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

### Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
DUS	9/14/2011	David Royster / 71258 / dcro223@uky.edu	
Chair	9/14/2011	David Leep / 73470 / leep@uky.edu	
Faculty	09/21/2011	David Leep / 73470 / leep@uky.edu	
College of A&S	11/8/11	Anna Bosch, Assoc. Dean / 7-6689 / bosch@uky.edu	
		/ /	

### External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision <sup>8</sup>
Undergraduate Council	2/14/2011	Sharon Gill	
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

<sup>8</sup> Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

MA 123  
Elementary Calculus and its Applications

**Instructor:****Office Address:** Patterson Office Tower**Email:****Office Phone:****Office hours:****Course Description:**

An introduction to differential and integral calculus, with applications to business and the biological and physical sciences. Not open to students who have credit in MA 113.

**Prerequisites:**

Math ACT score of 26 or above, or math SAT of 600 or above, or MA 109, or a score of 70% or better on the UK Calculus Placement Exam or appropriate

**Student Learning Outcomes:**

After completing this course, the student will be able to:

1. Demonstrate an understanding of limits and continuity.
  - 1.01 Determine limits analytically, numerically and graphically including one-sided limits and limits at infinity.
  - 1.02 Analyze the limit behavior of a function at a point in its domain to determine if the function is continuous at that point. Determine intervals on which a function is continuous. Analyze and classify the discontinuities of a function.
2. Demonstrate an understanding of derivatives and the ability to compute derivatives.
  - 2.01 Use the limit definition of the derivative to determine the existence and to find the derivative of a given function.
  - 2.02 Find the derivative of a function by identifying and applying the appropriate derivative formula.
  - 2.03 Find higher order derivatives.
3. Understand the interpretation of derivatives and their applications in a business environment.
  - 3.01 Interpret the derivative as a rate of change.
  - 3.02 Find the slope of the tangent line to the graph of a function at a given point.
  - 3.03 Use the first derivative to determine intervals on which the graph of a function is increasing or decreasing and to determine critical points of the function.
  - 3.04 Use the second derivative to determine intervals on which the graph of a function is concave upwards or concave downwards and to determine points of inflection.
  - 3.05 Find and classify relative extrema and, on a closed interval, absolute extrema of a function.
  - 3.06 Solve applied problems including marginal analysis applications.

- 3.07 Explain the relationship between marginal cost and average cost.
- 4. Understand the concept of integration and demonstrate ability to find indefinite and definite integrals apply those results to the business setting.
  - 4.01 Construct antiderivatives analytically.
  - 4.02 Find indefinite integrals using integration formulas and the method of substitution.
  - 4.03 Find indefinite integrals using integration by parts.
  - 4.04 Identify definite integrals of functions as the areas of regions between the graph of the function and the  $x$ -axis.
  - 4.05 Estimate the numerical value of a definite integral using a Riemann sum.
  - 4.06 Understand and use the Fundamental Theorem of Calculus to evaluate definite integrals.
  - 4.07 Use definite integrals to calculate the area of the region under a curve and the area of the region between two curves.
  - 4.08 Determine present value and future value for an investment with interest compounded continuously.
  - 4.09 Determine the average value of a function on an interval.
  - 4.10 For given supply and demand functions find and interpret the consumer's surplus and the producer's surplus.

**Course Goals:**

This course will cover each of the topics from the first ten chapters of the text, ***Calculus***, by Gootman. All of these topics are covered in the online homework sets. Your main goal should be to learn the material well enough so that you can use calculus in an applied context such as business or social science. It is virtually impossible to learn mathematics without actively taking part in the learning. To understand what this means, consider the impossibility of learning to play tennis by listening to someone describe how to play tennis. You will not learn the material in this course by listening to the lectures, and thinking to yourself - "Yes, I understand that". You must work the problems and make mistakes before you will begin to learn. The instructor's task is that of an assistant to help you learn as much of the material as you desire.

In this course it will not be sufficient to memorize an algorithm for doing specific types of problems. You will be expected to understand the material well enough so that you can work problems similar to, but not identical to the ones we work in class and the ones you encounter in the homework.

**Required Materials:**

***Calculus*** by Elliot Gootman

Links to lecture notes, practice/review problems, old exams, description of grading policy, descriptions of written projects, *etc.* are all available at the course website:

<http://math.uky.edu/~ma123>

**Description of Course Activities and Assignments**

Homework will be done online using the online homework system MathClass at <http://mathclass.org>. Please visit

<http://www.ms.uky.edu/~ma123/Fall11/homework.html> for a much more complete description of this homework system and some suggestions on how to best use this system to improve your chances for successful completion of this course. Homework due dates are posted at <http://www.ms.uky.edu/~ma123/Fall11/homeworkDue.html>

### Course Assignments

Exam 1:	100 points
Exam 2:	100 points
Exam 3:	100 points
Exam 4:	100 points
HW:	90 points
Lecture Attendance/Participation:	10 points
Recitation Attendance/Participation:	10 points
Written Project 1:	20 points
Written Project 2:	20 points

A: 495 - 550 points

B: 440 - 494 points

C: 385 - 439 points

D: 330 - 384 points

E: 0 - 329 points

### Final Exam Information

The final exam is a common exam. It is scheduled for Wednesday, December 14, 2011 from 6:00 – 8:00 PM.

### Mid-term Grade

Mid-term grades will be posted in myUK by the deadline established in the Academic Calendar (<http://www.uky.edu/Registrar/AcademicCalendar.htm>)

### Course Policies:

#### Submission of Assignments:

Homework will be done online on mathclass.org. Due dates are posted as cited above. The two written assignments are described at <http://www.ms.uky.edu/~ma123/Fall11/written.html>. The first is to be done using MS Excel and submitted using the online homework system. It is due by 11:59 PM on Wednesday, Sept 28. The second written assignment is to be turned in at the beginning of the lecture on Wednesday, October 26.

#### Attendance Policy.

You are expected to attend and participate in class regularly. Attendance will be taken every day in lecture. Pop quizzes may be given on occasion in lieu of attendance.

You are expected to attend and participate in recitation regularly. To receive credit

for attending recitation, you must actively participate in discussions and complete worksheets.

Please note that if you have excused absences in excess of one fifth of the total class contact hours, you will be REQUIRED to petition for a “W” in the course. See section 5.2.4.2 [www.uky.edu/StudentAffairs/Code/part2.html](http://www.uky.edu/StudentAffairs/Code/part2.html) for more information regarding excused absences.

**Excused Absences:**

Students need to notify the professor of absences prior to class when possible. S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit “reasonable cause for nonattendance” by the professor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754).

Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

**Verification of Absences**

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request “appropriate verification” when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

**Academic Integrity**

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: <http://www.uky.edu/Ombud>. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed



from others need to be properly credited.

Part II of *Student Rights and Responsibilities* (available online <http://www.uky.edu/StudentAffairs/Code/part2.html>) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.

Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

**Please note:** Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

### **Accommodations due to disability**

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address: [jkarnes@email.uky.edu](mailto:jkarnes@email.uky.edu)) for coordination of campus disability services available to students with disabilities.

### **How to Succeed**

You learn mathematics by solving lots of problems. As an absolute minimum you should complete all of the assigned homework. (Less than 5% of students that earned an A or a B in the course last semester had completed less than 90% of the homework and nearly every student that completed less than 70% of the homework earned a D or an E in the course.) You should work the homework

problems repeatedly until you can solve them on the first try. (You get unlimited attempts at the homework problems, but you only get one chance on the exams!) I recommend spending a few minutes each day working through old homework problems, especially the assignments you struggled with. (Use the "Specific Version" in WHS to create problems with different numbers.) If you do not perform well on the exams, seek help immediately!

### Help

Mathskeller: CB 63, Monday – Friday, 9 am to 5 pm

Math professors, math grad students, and undergraduate teaching assistants provide free help in the Mathskeller. The schedule at [www.mathskeller.com](http://www.mathskeller.com) lists times when MA 123 specific tutors will be working.

The Study: South Campus Third Floor Commons, Sunday 6pm - 10pm, Monday-Thursday 3pm - 10pm

The Study provides free peer tutoring. See [www.uky.edu/UGS/study](http://www.uky.edu/UGS/study)

Web Homework feedback:

Please do not e-mail me or your recitation instructor specific questions on the homework. Specific questions on homework should be asked using the feedback system in WHS. To ensure that you receive a response, please give as much detail as possible. Please allow 24 hours for a response.

Visit me or your recitation instructor during office hours.

### Tentative Course Schedule

Date	Description
W 8/24	Introduction/ Algebra Review
F 8/26	Algebra Review (Chapter 1)
M 8/29	Rates of Change (Chapter 2)
W 8/31	Rates of Change (Chapter 2)
F 9/2	Rates of Change (Chapter 2)
M 9/5	<i>Labor Day - no class</i>
W 9/7	Limits (Chapter 3)
F 9/9	Limits (Chapter 3)
M 9/12	Limits (Chapter 3)
W 9/14	Computing Some Derivatives (Chapter 4)
F 9/16	Computing some Derivatives (Chapter 4)
M 9/19	Review for Exam 1
W 9/21	Review for Exam 1; <b>EXAM 1, 5-7 pm</b>
F 9/23	Formulas for Derivatives (Chapter 5)
M 9/26	Formulas for Derivatives (Chapter 5)
W 9/28	Formulas for Derivatives (Chapter 5); <b>Written Assignment 1 Due</b>
F 9/30	Higher Derivatives (Chapter 5)

M 10/3	Exponential and Logarithmic Functions (Supplement)
W 10/5	Exponential and Logarithmic Functions (Supplement)
F 10/7	Exponential and Logarithmic Functions (Supplement)
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M 10/10	Extreme Values and Mean Value Theorem (Chapter 6)
W 10/12	Extreme Values and Mean Value Theorem (Chapter 6)
F 10/14	Curve Sketching and Concavity (Chapter 6)
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M 10/17	Review for Exam 2
W 10/19	Review for Exam 2; <b>EXAM 2, 5-7 pm</b>
F 10/21	Curve Sketching and Concavity (Chapter 6)
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M 10/24	Curve Sketching and Concavity (Chapter 6)
W 10/26	Word Problems (Chapter 7); <b>Written Assignment 2 Due</b>
F 10/28	Word Problems (Chapter 7)
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M 10/31	Word Problems (Chapter 7)
W 11/2	The Idea of the Integral (Chapter 8)
F 11/3	The Idea of the Integral (Chapter 8)
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M 11/7	The Idea of the Integral (Chapter 8)
W 11/9	Computing some Integrals (Chapter 9)
F 11/11	Computing some Integrals (Chapter 9)
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M 11/14	Review for Exam 3
W 11/16	Review for Exam 3; <b>EXAM 3, 5-7 pm</b>
F 11/18	Computing some Integrals (Chapter 9)
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M 11/21	Fundamental Theorem of Calculus; Antiderivatives (Chapter 10)
W 11/23	<i>Thanksgiving Break - no class</i>
F 11/25	<i>Thanksgiving Break - no class</i>
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M 11/28	Fundamental Theorem of Calculus; Antiderivatives (Chapter 10)
W 11/30	Fundamental Theorem of Calculus; Antiderivatives (Chapter 10)
F 12/2	Fundamental Theorem of Calculus; Antiderivatives (Chapter 10)
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M 12/5	Fundamental Theorem of Calculus; Antiderivatives (Chapter 10)
W 12/7	Review for Final Exam
F 12/9	Review for Final Exam
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W 12/14	<b>FINAL EXAM, 6:00-8:00 pm</b>