

MIDSTATE COLLEGE
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Spring 2015

Course number & Name: MAT 170 Calculus I
Credit hours: 6 quarter hours **Method of Delivery:** Arranged

Text: Single Variable Calculus, 2nd edition
Author: Briggs, Cochran, Gillett
Publisher: Pearson

Course Description: Differentiation of polynomial, rational, exponential, logarithmic, and trigonometric functions and associated applications. Introduction to integration with applications
(IAI M1 900)

Prerequisite: MAT158 Trigonometry

Topics:

limits and continuity, infinite limits and limits at infinity, the derivative, rate of change, and slope. Further topics include differentiation of polynomial, rational, exponential, logarithm, and trigonometric functions using the general rules of differentiation (the product and quotient rule, the chain rule, etc.). Graphing using first and second derivative tests followed by curve sketching techniques, absolute maxima and minima, L'Hopital's Rule, and optimization. Other topics include implicit differentiation, approximation by differentials; higher order derivatives, Rolle's Theorem, and applications of the derivative; anti-derivative; the definite integral; and the fundamental theorem of calculus.

Requirements for Completing the Course: Achieve an overall average of 'C'.

Topics to be covered: Limits, Differentiation, Applications of Differentiation, Integration, and Logarithm

Course Objectives: Upon completion of this course, the student will be able to:

1. explain the concepts of function, derivative and the definite integral, in writing and using graphical, numerical, and algebraic ideas.
2. determine the derivative of the elementary functions (polynomial, trigonometric, rational, exponential, logarithmic) at a point using numerical, graphical, and algebraic techniques.
3. determine the definite integral of the elementary functions using numerical, graphical, and algebraic techniques.
4. interpret the derivative and definite integral in a variety of problem settings.
5. differentiate functions using the rules for differentiation (product, quotient, chain rule) with a high degree of accuracy.
6. find anti-derivatives for some elementary functions directly or using substitution.
7. solve optimization problems given a reasonable real world setting and appropriate data.
8. apply calculus to solve problems from a variety of fields.
9. relate a function to its derivative and anti-derivatives graphically, numerically, and algebraically.

Midstate Grading scale:	90 - 100	A
	80 - 89	B
	70 - 79	C
	60 - 69	D
	0 - 59	F

Midstate Plagiarism Policy:

Plagiarism is using another person's words, either by paraphrase or direct quotation, without giving credit to the author(s). Plagiarism can also consist of cutting and pasting material from electronic sources by submitting all or a portion of work for assignment credit. This includes papers, computer programs, music,

sculptures, paintings, photographs, etc. authored by another person without explicitly citing the original source(s). These actions violate the trust and honesty expected in academic work. Plagiarism is strictly against the academic policy of Midstate College. Its seriousness requires a measured, forceful response which includes consequences for inappropriate and/or no citation.

In courses containing writing assignments, the college promotes the use of an electronic resource which compares the student's writing against previously submitted papers, journals, periodicals, books, and web pages. Students and instructors can use this service to reduce the incidence of plagiarism. This electronic resource has been found to conform to legal requirements for fair use and student confidentiality. It is able to provide a report to the student indicating the parts of the assignment that match.

Student Success:

The Office of Student Success is available to students seeking tutoring for individual classes or who need assistance with writing assignments. Information is also available on test taking techniques, how to take notes, developing good study skills, etc. Contact Student Success in Room 217 (in person); (309) 692-4092, extension 2170 (phone); studentsuccess@midstate.edu (email).

Instructor Information: Sara Leigh, Room 132, (309) 692-4092, saleigh@midstate.edu

Policies and Procedures: This is a tentative syllabus and outline and is subject to change at the discretion of the instructor. **Quizzes and exams must be taken on the day scheduled.** Please see below for further information on this policy.

1. **Attendance:** Regular attendance is expected. It is the student's responsibility to notify the instructor, preferably in advance, when a class will be missed. If the instructor **receives no call or email within one day** of the missed class period, **you will be considered missing, and no makeup will be allowed** for that day.
2. **Homework:** Weekly homework will be assigned on the material covered that week and will be due the following week. The odd problems will be assigned, which have answers in the back of the book – thus you must **SHOW WORK** to receive credit on the homework!
3. **Exams:** There will be 3 exams given. Each exam is worth 20% of your grade. **No makeups are given for exams** without extreme extenuating circumstances, and I will require documentation. **Tardiness is also not permitted for exams** – if you are more than 15 minutes late, you may not be allowed to take the exam!
4. **Extra credit:** Students may complete the even numbers of a homework assignment for extra credit. The number of extra credit points awarded is proportional to the number of problems completed, up to a maximum of double points for the homework.

Grading Specifications:

Participation/Attendance:	10%
Homework:	30%
Exams:	60% (20% for each exam)

Course Schedule:

Week One

Introduction/course administration

Sections: 1.3 Trigonometric Functions, HW odds: 9-21, 31-39

Week Two

Sections: 2.1 The Idea of Limits, HW odds: 7-19
2.2 Definitions of Limits, HW odds: 7-13, 19-23
2.3 Techniques for Computing Limits, HW odds: 17-33
2.4 Infinite Limits, HW odds: 9-23
2.5 Limits at Infinity, HW odds: 19-33
2.6 Continuity, HW odds: 9-29

Week Three

Sections: 3.1 Introducing the Derivative, HW odds: 9-29
3.2 Working with Derivatives, HW odds: 5-13
3.3 Rules of Differentiation, HW odds: 7-31
3.4 The Product and Quotient Rules, HW odds: 7-27
3.5 Derivatives of Trigonometric Functions, HW odds: 7-25
3.6 Derivatives as Rates of Change, HW: 9, 11, 17
3.7 The Chain Rule, HW odds: 7-35

Week Four

Catch up week, review and take exam 1

Week Five

Sections: 4.1 Maxima and Minima, HW odds: 11-17, 23-37
4.2 What Derivatives Tell Us, HW odds: 15-23, 35-39, 51-55, 63-69
4.3 Graphing Functions, HW odds: 9-23
4.4 Optimization Problems, HW odds: 5-17
4.6 Mean Value Theorem, HW odds: 7-11, 17-21
4.7 L'Hopital's Rule, HW odds: 13-17, 35-39
4.9 Antiderivatives, HW odds: 11-39

Week Six

Sections: 5.1 Approximating Areas under Curves, HW odds: 9-17
5.2 Definite Integrals, HW odds: 39-43
5.3 Fundamental Theorem of Calculus, HW odds: 29-55
5.4 Working with Integrals, HW odds: 7-11, 21-31
5.5 Substitution Rule, HW odds: 13-25, 39-45

Week Seven

Sections: 6.1 Velocity and Net Change, HW odds: 15-21, 27-31
6.2 Regions Between Curves, HW odds: 13-25
6.3 Volume by Slicing, HW odds: 7, 9, 17, 19, 25, 29, 33, 35
6.4 Volume by Shells, HW odds: 5-11, 15-19

Week Eight

Catch up week, review and take exam 2

Week Nine

Sections: 7.1 Inverse Functions, HW odds: 19-25, 29-33
7.2 The Natural Logarithmic & Exponential Functions, HW odds: 7-15, 21-25, 31-35, 41-45
7.3 Log and Exp Functions with Other Bases, HW odds: 9-25, 33-37
7.4 Exponential Models, HW odds: 11-25

Week Ten

Sections: 7.5 Inverse Trigonometric Functions, HW odds: 11-17, 27-33, 49-59, 67-73
7.6 L'Hopital's Rule and Growth Rates, HW odds: 19-39
7.7 Hyperbolic Functions, HW odds: 23-39

Week Eleven

Sections: 8.1 Basic Approaches to Integration, HW odds: 15-39
8.2 Integration by parts, HW odds: 11-35
8.3 Trigonometric Integrals, HW odds: 13-35
8.4 Trigonometric Substitutions, HW odds: 17-31

Week Twelve

Catch up week, review and take exam 3