

Montgomery County Community College
MAT 188 DC
Calculus with Review I
Walter R. Hunter
Fall 2005

Meeting Times: MW 11:10 to 12:20, F 11:10 to 12:50

Textbook: Calculus I with Precalculus, a One Year Course, by Larson, etc., Sec. Edition
Calculus I, by Ostebee & Zorn is on reserve in the library.
Calculus I, by Stewart is on reserve in the library.

Graphing Calculator: The TI 83 or 84 Plus is required for the course.

Course Objective: A four credit course primarily designed for students who will major in mathematics, science, engineering, or business. The sequence of courses, MAT 188 and MAT 189, is designed for students who have a good background in functions and trigonometry. MAT 188 and MAT 189 cover similar topics as the sequence MAT 161, MAT 162, and MAT 190 but at a faster pace. You must pass both MAT 188 and MAT 189 to transfer credits equivalent to Calculus I. You should not take MAT 188 unless you are planning on taking MAT 189 the next semester.

PREREQUISITE:

- MAT 100 with a B or better and high school trigonometry
- Math placement test above MAT 100 and high school trigonometry
- MAT 116 with a C or better.

Contact Information: Office: 146 Parkhouse Hall
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Office Hours: Tuesday 9:00 to 10:30
Thursday 9:00 to 10:30

Grading: Four Exams 55%	Grades: 90 to 100 A
Final Exam 15%	80 to 89 B
Assignments 25%	70 to 79 C
Group work 5%	60 to 69 D
	Below 60 F

Makeup Exam Policy: A makeup exam will NOT be given under any circumstances. You MUST contact me right away. Do not wait until the next class to talk to me.

Withdrawal Policy: You may withdraw at any time during the semester. You may NOT withdraw during final exam week.

Students with disabilities may be eligible for accommodations in this course. Please contact the Director of Services for Students with Disabilities in the Counseling Center, College Hall, at (215) 641- 6575/6577 for more information.

MAT 188 OUTLINE

Introduction to the Slope of the Tangent Line

Homework: Handout, Page 5 from notes

Examples from Ostebee Zorn: The Slope of a graph at a Point, page 98, 99, Example 4

Local Linearity and Where $f'(x)$ Doesn't Exist

Homework: Handout, page 15 from notes

Examples from Ostebee Zorn: Estimating Derivatives, pages 108 to 111.

The Geometry of the Derivative

Homework: Handout, page 21 from notes

Examples from Ostebee Zorn: Section 2.3

Introduction to the Second Derivative

Homework: Handout, page 30 from notes

Examples from Ostebee Zorn: Section 2.4

Estimating the Derivative

Homework: Handout, page 38 from notes

Introduction to Limits

Homework: Section 2.2 page 154; 17, 20, 23, 25

Section 3.2 page 215; 1, 7, 9, 11, 13, 34, 38, 39, 41, 47,

Section 3.4 page 234; 7, 11, 15, 17, 92

Examples from book: Section 2.2, The Leading Coefficient Test, Examples 2,3

Section 3.2, Pages 210 to 212

Section 3.4, One Sided Limits, page 231, Examples 2, 3, 5

Properties and Definition of Limits

Homework: Section 3.3 page 224; 1, 5, 13, 27, 31, 34, 61, 63, 64, 71, 75

Examples from book: Section 3.3, Examples 6, 7

Homework: Section 3.2 page 215; 15, 16, 17, 21

Examples from book: Section 3.2, Page 213, Examples 5, 6

Review Problems: Page 13; 185, 186 (See page 10 for an example.)

Page 23; 45, 47, 49, 53 (See example 6.)

Continuity

Homework: Section 3.4 page 234; 3, 5, 24, 25, 26, 29, 37, 42, 49, 65, 79, 83, 88, 89

Examples from book: Section 3.4, Examples 4,7

Definition of Derivatives

Homework: Section 4.1 page 259; 1, 5, 9, 13, 25, 35, 36, 37, 38, 39, 42, 67, 71, 85, 88, 90

Examples from book: Section 4.1, Pages 252 to 253, Examples 1, 2, 3, 6

Derivative Formulas of Polynomials

Homework: Section 4.2 page 270; 11, 13, 19, 39, 49, 59, 69, 73, 77, 78, 81, 83, 85, 89, 97 99

Section 2.2 page 154; 31, 35

Handout, page 61 from notes

Examples from book: Section 4.2 Theorems 4.2 to 4.5, Examples 4, 7, 8, 9

Section 2.2 Know how to use the Quadratic Formula (page 7)

TEST I

Zeros of Polynomials, Part 1

Homework: Section 2.2 page 154; 31, 35, 39, 41, 43, 45, 47, 53, 91
Section 2.4 page 172; 5, 9, 19, 31, 33, 41, 63, 67

Handout, page 68 from notes

Examples from book: Section 2.2 Real Zeros of Polynomial Functions (page 151),
Example 4 (Class will concentrate on using the
calculator to find the zeros of the polynomial.)

Section 2.4 Examples 1a, 2, 4, 6

Zeros of Polynomials, Part 2

Homework: Section 2.3 page 164; 1, 21, 41, 47a,b, 69, 79, 85, 88, 89

Section 2.5 page 181; 5, 35, 37, 55, 63, 69, 92, 93, 99, 101

Handout, page 75 from notes

Examples from book: Section 2.3 Example 1 and the Division Algorithm, Examples 4, 5

Examples from book: Section 2.5 Examples 1, 5, 7

Applications of Polynomials

Homework: Handout, page 80 from notes

Examples from book: Section 4.2 Examples 8, 9

Antiderivatives and Indefinite Integration for Polynomials

Homework: Section 6.1 page 394; 12, 17, 19, 33, 39, 41, 43, 45,

53, 55, 57, 59, 62, 71, 73, 76, 80

Examples from book: Section 6.1 Examples 2, 4, 7

Area

Homework: Section 6.2 page 407; 23, 24, 25, 26, 49

Examples from book: Section 6.2 Examples 3, 5

Riemann Sums and Definite Integrals

Homework: Section 6.3 page 417; 3, 9, 11, 13, 15, 17, 23, 33, 34, 41, 46 a, c, d, 47,
48, 49, 50, 52, 55,

Examples from book: Section 6.3 Definition of the Definite Integral, Properties of the
Definite Integral, Examples 2, 3, 5, 6

Fundamental Theorem of Calculus

Homework: Section 6.4 page 429; 3, 5, 9, 11, 25, 27, 29, 33, 49, 50,

51, 52, 53, 55, 57, 59, 60, 65, 66, 69, 71, 75, 79, 80

Examples from book: Section 6.4 Theorems 6.9, 6.10 Examples 2, 3, 4

Area Between Curves

Homework: Handout, page 107 from notes

Examples from Stewart: Section 6.1 Examples 2, 5, 6

TEST II

Basic Trigonometry

Homework: Section 9.1 page 556; 7, 9, 13, 29, 55, 59, 67, 99, 101

Section 9.2 page 564; 1, 21, 29, 31, 39, 67

Section 9.3 page 571; 1, 3, 9, 33, 55, 57, 61, 71, 74, 76

Section 9.4 page 580; 2, 8, 11, 17, 71, 85, 95, 104, 111

Examples from book: Section 9.1 Review the vocabulary on pages 548 to 550.

Section 9.2 Definitions of Trigonometric Functions, Definition of a Periodic Function, Even and Odd Trigonometric Functions, Examples 1c,d, 2a

Section 9.3 Right Triangle Definitions, Fundamental Trigonometric Identities, Examples 1, 4, 5, 6

Section 9.4 Definitions of Trigonometric Functions of Any Angle, Definition of Reference Angle, Examples 2, 3, 6

Graphs of Trigonometric Functions

Homework: Section 9.5 page 590; 1, 5, 7, 11, 15, 19, 21, 23, 35, 43, 49, 55, 61, 65, 69, 81, 83, 87

Section 9.6 page 600; 1 to 6, 29, 31, 33, 35, 39, 41, 48, 51, 65, 75

Examples from book: Section 9.5 Understand Amplitude, Period, and Shifting.

Examples 2, 3, 5, 6, 7 (Use the calculator to graph.)

Section 9.6 Know the basic graphs of tangent, cotangent, secant, cosecant. Examples 2, 3, 4, 5

Trigonometric Identities

Homework: Section 10.1 page 632; 1, 11, 27, 33, 39, 45, 113

Section 10.2 page 639; 1, 5, 21, 57

Section 10.4 page 655; 51, 55, 56, 79, 80

Section 10.5 page 663; 19, 21, 103, 105

Examples from book: Section 10.1 Examples 1, 2

Section 10.2 Examples 1, 4

Section 10.4 Know how to use the sum and difference formulas. Example 6

Section 10.5 Know how to use the double-angle and half-angle formulas. Example 2

Function Composition and Inverse Functions

Homework: Section 1.4 page 106; 29, 39, 40, 43, 49, 53, 55

Section 1.5 page 114; 11, 15, 23, 25, 27, 33, 35, 41, 59, 75, 76, 77, 78, 85

Examples from book: Section 1.4 Examples 5, 6, 7

Section 1.5 Understand the definition of the inverse function. Examples 2, 3, 5, 6

Inverse Trigonometric Functions

Homework: Section 9.7 page 610; 17, 29, 33, 34, 35, 36, 37, 41, 47, 61, 65, 69, 83, 85, 87, 89, 99, 100, 102, 106

Section 9.8 page 617; 1, 27, 29, 31, 32, 46, 50

Examples from book: Section 9.7 Understand the definitions of the inverse trigonometric functions. Examples 2, 4, 5, 7

Section 9.8 Examples 2, 3, 4

Solving Trigonometric Equations

Homework: Section 10.3 page 647; 1, 7, 11, 17, 21, 24, 29, 33, 35, 41, 47, 51, 57, 61, 69, 73

Examples from book: Section 10.3 Examples 1, 5, 8, 10

TEST III

Limits of Trigonometric Functions

Homework: Section 11.1 page 675; 1, 2, 3, 5, 11, 19, 20, 24, 25, 27, 29, 31, 33, 37, 39,
45, 55, 59, 60, 61, 64, 65

Examples from book: Section 11.1 Examples 3, 4, 5

Derivatives of Sine and Cosine

Homework: Section 11.2 page 685; 1, 2, 25a, 73, 82, 99

Examples from book: Section 11.2 Examples 1, 2a

Product/Quotient Rules

Homework: Section 4.3 page 280; 5, 7, 11, 25, 41, 45, 55, 65, 73, 77, 78, 79, 80, 89, 97
Section 11.2 page 685; 5, 9, 11, 13, 15, 17, 21, 22, 23, 61, 65

Examples from book: Section 4.3 Examples 1, 3, 5
Section 11.2 Examples 2, 5

Chain Rule

Homework: Section 4.4 page 289; 1, 7, 9, 23, 29, 51, 57, 58, 59, 60, 61b

Section 11.2 page 685; 26, 31, 33, 37, 41, 43, 75, 79, 101, 105

Examples from book: Section 4.4 Examples 3, 4, 9

Section 11.2 Examples 6, 7, 8, 9

Graphing Trigonometric Functions Using Derivatives

Homework: Section 11.2 page 685; 89, 91, 93, 94, 96

Handout, page 171 from notes

Examples from book: Section 11.2 Example 9

Integration of Trigonometric Functions

Homework: Section 11.3 page 694; 1, 5, 33, 41, 49, 60, 65, 66, 73

Handout, page 177 from notes

Examples from book: Section 6.5 Theorems 6.12, 6.15, Examples 1, 3, 8, 10

Section 11.3 Theorem 11.5, Examples 1a

Integration by U Substitution

Homework: Section 6.5 page 442; 1, 5, 9, 11, 29, 47, 67, 69, 71, 76, 81

Section 11.3 page 694; 9, 11, 12, 14, 15, 17, 62

Examples from book: Section 6.5 Theorems 6.12, 6.15, Examples 1, 3, 8, 10

Section 11.3 Examples 1, 2, 5, 6 a,b

TEST IV

FINAL EXAM

LEARNING OBJECTIVES: Upon completing this course, students should have the following knowledge and skills.

1. Evaluate limits of polynomials and trigonometric functions including one-sided limits, infinite limits, and limits at infinity.
2. Understand the concept of the limit.
3. Verify the limit of a linear function by the definition.
4. Discuss the continuity and points of discontinuity of polynomial, piece-wise, and trigonometric functions.
5. Understand the concept of the derivative.
6. Differentiate polynomials and trigonometric functions using the product, quotient and chain rules.
7. Integrate polynomials and trigonometric functions.
8. Integrate function by the method of substitution.
9. Understand and apply the Fundamental Theorem of Algebra.
10. Explain and illustrate the Fundamental Theorem of Calculus.
11. Apply knowledge of integration to finding area.
12. Apply knowledge of differentiation to curve sketching and maximum-minimum problems involving polynomials and trigonometric functions.
13. Be familiar with trigonometric definitions involving angles, circular functions, and right triangles.
14. Graph the six trigonometric functions and their inverses.
15. Solve trigonometric identities and equations.
16. Use law of sines and cosines to solve trigonometric applications.
17. Be able to use the TI-83 plus graphing calculator in relevant Calculus I and Precalculus concepts.