Course Title: Calculus with Review I

Course Prefix and Number: MAT 188

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

Course Description: 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.


Required Materials: A TI-83, TI-83 Plus, TI-83 Plus Silver, or TI-84 graphing calculator

Learning Goals: 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-84 plus graphing calculator in relevant Calculus I and Precalculus concepts.

Lateness Policy: A lateness is treated the same way as an absence.

Assignment/Test Make-Up Policy
No make-ups on quizzes or tests. If a student misses a test, the grade he/she receives on the final will be substituted. This will only be done once. If one has been there for all four tests, the final will replace the lowest test grade.

**Late Assignment Policy:** Assignments will be deducted one letter grade per class missed.

**Class Participation:** Students are encouraged to participate in class.

**Withdrawal Policy**

If a student wishes to withdraw from the course, the student must complete a formal withdrawal form. This form must be signed by me. Any student who fails to officially withdraw from a course will receive a grade of “F.” Withdrawals will be signed up to the sixth week of class.

**Cheating and Plagiarism Policy:** See College policy.

**Academic Discipline:** See page 28 of the College catalogue

**Grade Changes and Challenges:** See page 26 of the college catalogue

**Methods of Evaluation**

There will be four (4) major tests as indicated in the syllabus. There will be quizzes and homework assignments that will be turned in and graded. I will drop the lowest two quiz/homework grades. There will be a final exam scheduled at the end of the semester during finals week.

**Criteria for Evaluation**

Tests will be worth 100 points each, quizzes and worksheets will be worth 100 points each, and the final will be worth 150 points.

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<tr>
<td>A</td>
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<td>D</td>
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**Class Cancellation Policy:** For instructor illness - phone chain. For inclement weather—radio: 320 (day), 2320 (evening)

**Available Support Systems:** Disk Supplement, Learning Assistance Lab (LAL), Library, Computer labs, etc.

**Classroom Expectations**

1. Arrive on time.
2. No sharpening pencils during class.
3. No cell phones or pagers turned on.
4. Seek help immediately if you don’t understand.

**Students with Disabilities**
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 215-641-6576 or 6577 for more information.

See web page for sample tests, review sheets and class notes.
MAT 188 OUTLINE

Introduction to the Slope of the Tangent Line
Homework: Page 7 from notes

Local Linearity and Where f'(x) Doesn’t Exist
Homework: Page 19 from notes

The Geometry of the Derivative
Homework: Page 27 from notes

Introduction to the Second Derivative
Homework: Page 37 from notes

Estimating the Derivative
Homework: Page 47 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
Page 73 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 1
Zeros of Polynomials
Homework: Section 2.2, page 154, #31, 35, 47, 53, 91
       Section 2.3, page 164, #69, 85, 88, 89
       Section 2.4, page 172, #5, 9, 19, 31, 33, 41, 63, 67
       Section 2.5, page 181, #5, 55, 63, 67, 69, 92, 93, 99, 101
       Page 89 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
       Section 2.5 Examples 1, 5, 7

Applications of Polynomials
Homework: Page 95 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, 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
       Examples from book: Section 6.4, Theorems 6.9, 6.10 Examples 2, 3, 4

Area Between Curves
Homework: page 123 from notes
       Examples from Stewart: Section 6.1 Examples 2, 5, 6

TEST 2
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 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, 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  
Example 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 3
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

Deviations 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
page 194 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, 66, 73
page 200 from notes
Examples from book: Section 6.5 Theorems 6.12, 6.15, Examples 1, 3, 8, 10
Section 11.3 Theorem 11.5 Example 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, 6a, b

TEST 4

FINAL EXAM