

# Cover Page

## MTH 166 PRECALCULUS WITH TRIGONOMETRY

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Revised: Fall 2016

# **MTH 166**

## **PRECALCULUS WITH TRIGONOMETRY**

### **COURSE OUTLINE**

#### **Prerequisites:**

**MTE 1, 2, 3, 4, 5, 6, 7, 8, and 9 or a placement recommendation for MTH 166**

#### **Course Description:**

**Presents College Algebra, analytic Geometry, Trigonometry, and Algebraic, exponential, and logarithmic functions. Credit will not be awarded for both MTH 163 and MTH 166.**

**Semester Credits: 5 Lecture Hours: 5 Lab/Recitation Hours: 0**

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# MTH 166 PRECALCULUS WITH TRIGONOMETRY

## Course Outcomes

At the completion of this course, the student should be able to:

1. Give and apply the definition of a function.
2. Understand Inverse functions.
3. Understand rational, exponential, logarithmic, and trigonometric functions.
4. Find zeros of appropriate functions using calculator.
5. Solve systems of linear equations by matrix methods.
6. Solve trigonometric equations and identities.
7. Solve exponential and logarithmic equations.
8. Solve Triangles using Law of Sines and Law of Cosines.
9. Solve Triangles using right angle Trigonometry.
10. Understand Inverse Trigonometric Functions.

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# MTH 166 PRECALCULUS WITH TRIGONOMETRY

Required Materials:

Textbook, TI Graphing Calculator

Textbook:

Precalculus—Graphing Approach, 10th Edition, Sullivan, Pearson Publishers. ISBN:  
9780321979070

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Topical Description: (Outline chapters and sections to be covered in the book – may include timeline)

<u>Topics</u>	<u>Chapters/Sections</u>
I. Lines, Functions and Their Graphs	1, 2, 5 (1.3, 2.1—2.5, 5.1)
II. Rational Functions & Complex Numbers	4 (4.2 – 4.6 & A60)
III. Exponential and Logarithmic Functions Chapter	5 (5.2-5.6)
IV. Trigonometric Functions Chapter	6 ( 6.1-6.5)
V. Additional Topics in Trigonometry	7 & 8 (7.1-7.3, 7.7) (8.1-8.3)
VI. Matrices and Determinants	11 (11.2-11.4)

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## Notes to Instructors

(List information about optional topics, departmental exams, etc)

The purpose of Math 166 is to get the students ready for Math 173 (no calculators allowed), and to prepare them for engineering and physics. For the engineering majors they are required to have a TI-89 Titanium, any other major can get by with a TI-83. Our job is to teach them how to use the TI-89 Titanium for calculations they need in physics and engineering.

### TEST 1

The material for Test 1 is for Math 173 hence no calculator is allowed on the test. Sections covered for Test 1 are 1.3, 2.1 – 2.5 and 5.1. The ideas covered are lines, functions, Domain, Range, inc. , dec., x-intercepts, y- intercepts, max and min. All intervals should be stated in interval form. Graph piecewise functions, find and simplify the difference quotient, compositions, and shifting of the basic graphs.

### TEST 2

The material for Test 2 is for Math 173, physics and engineering, hence a calculator is allowed. Sections covered for Test 2 are 4.2,4.3 , A60 and 4.5& 4.6. They should be able to graph rational functions by hand, given the vertical and horizontal asymptotes find the equation (obliques are **NOT included in their Calc sequence**), complex numbers by hand. The only material from Test 2 they use a calculator for is finding zeros using the solve function for real roots and csolve for the complex roots.

### TEST 3

The material for Test 3 is for the Math sequence. Sections covered are 5.2-5.6. They should understand 1-1 functions, exponential and log functions, change of base, log properties, solving exponential and logarithmic equations. A calculator is **NOT** allowed for this material, but, in class make sure they can evaluate a log by using the change of base formula.

### TEST 4

The material for Test 4 is for Math, engineering and physics, so a calculator is allowed. Sections covered are 6.1-6.5,7.1-7.3,7.7 and 8.1-8.3. Teaching the Trig is challenging as in their Math courses all they are allowed to use is the unit circle, whereas in engineering and physics they do everything by calculator.

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For Mathematics: We restrict our angles to the unit circle and they should be able to evaluate all six trig function, inverse sine, cosine and tangent only as well as be familiar with all the graphs, and trig identities, solving trig equations, and right angle trig. For engineering and physics: The angles they use are always in degrees and are not on the unit circle, ex. 2.35 degrees. They need to be able to evaluate all 6 trig functions using their calculator, as well as all six inverse trig functions using their calculator, solve triangles using right triangle trig, Law of Sines and Law of Cosines.

### **TEST 5 (Optional)**

Test 5 material is on matrices and solving systems of equations. Sections covered are 11.2-11.4.

Solving systems ( 11.2 ) is needed for engineering and physics so we do that on a calculator by finding the augmented matrix, rref, then write the answer.

The material from 11.3 and 11.4 is for the math sequence hence must be done by hand. Determinants, Cofactor expansion, Cramers Rule, operations on matrices, and inverses. Share with your students that in the calculus students instead of numbers in the matrices they will have to do these computations with functions.

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