



# Alabama Community College System

## MTH 115 Precalculus Algebra and Trigonometry

### I. MTH 115 Precalculus Algebra and Trigonometry – 4 Semester Hours

### II. Course Description

This course is a one-semester accelerated combination of Precalculus Algebra (MTH 112) and Precalculus Trigonometry (MTH 113). This course is intended for students with a strong background in college preparatory mathematics. The course includes the algebra of functions (including polynomial, rational, exponential, and logarithmic functions) as well as the study of trigonometric functions and inverse trigonometric functions. This course also includes extensive work with trigonometric identities, equations, and formulas; vectors; complex numbers; and polar graphs.

### III. Prerequisite

As determined by college but may be no less than a C or higher in MTH 100 and permission from the department chairperson.

### IV. Textbook

Due to the varied selection of quality college-level textbooks, each college will select the textbook needed to meet the requirements of this course.

### V. Course Objectives

By the end of the course, students will be able to:

1. demonstrate knowledge of the elementary properties of functions,
2. interpret polynomial and rational functions analytically and graphically,
3. interpret exponential and logarithmic functions analytically and graphically,
4. demonstrate knowledge of circular and right triangle approaches to trigonometry,
5. interpret trigonometric functions analytically and graphically,
6. analyze complex numbers and their relationship with trigonometry and vectors,
7. construct and interpret polar coordinates and polar graphs, and
8. connect trigonometric concepts to real world applications.

## VI. Course Outline of Topics

### Required Topics

1. Functions
2. Graphs of functions
3. Combinations of functions
4. Inverse functions
5. Quadratic functions
6. Polynomial functions
7. Real zeros
8. Complex numbers
9. Fundamental Theorem of Algebra
10. Rational functions
11. Exponential functions
12. Logarithmic functions
13. Properties of logarithms
14. Solving exponential and logarithmic equations
15. Applications of exponential functions
16. Radian and degree measure
17. The trigonometric functions and the unit circle
18. Trigonometric functions and right triangles
19. Trigonometric functions of any angle
20. Graphs of trigonometric functions
21. Inverse trigonometric functions
22. Applications of trigonometry
23. Verifying trigonometric identities
24. Solving trigonometric equations
25. Sum and difference formulas
26. Multiple-angle formulas
27. Law of sines
28. Law of cosines
29. Trigonometric form of a complex number
30. DeMoivre's Theorem and  $n$ th roots
31. Polar coordinates and graphs
32. Vectors and applications

### Optional Topics

1. Variation
2. Partial fractions
3. Binomial Theorem
4. Conic sections
5. Product-sum formulas

## **VII. Evaluation and Assessment**

Grades will be given based upon A = 90 – 100%, B = 80 – 89%, C = 70 – 79%, D = 60 – 69%, and F = below 60%.

## **VIII. Attendance**

Students are expected to attend all classes for which they are registered. Students who are unable to attend class regularly, regardless of the reason or circumstance, should withdraw from that class before poor attendance interferes with the student's ability to achieve the objectives required in the course. Withdrawal from class can affect eligibility for federal financial aid.

## **IX. Statement on Discrimination/Harassment**

It is the official policy of the Alabama Community College System and entities under its control, including all Colleges, that no person shall be discriminated against on the basis of any impermissible criterion or characteristic, including, without limitation, race, color, national origin, religion, marital status, disability, sex, age, or any other protected class as defined by federal and state law. (ACCS Policies 601.02 and 800.00)

## **X. Americans with Disabilities**

*The Rehabilitation Act* of 1973 (Section 504) and the *Americans with Disabilities Act* of 1990 state that qualified students with disabilities who meet the essential functions and academic requirements are entitled to reasonable accommodations. It is the student's responsibility to provide appropriate disability documentation to the College.