

## TRIGONOMETRY AND ANALYSIS

This course is designed as an alternative to PreCalculus. Topics studied include analytic geometry, trigonometric functions of acute angles and angles of rotation, logarithmic functions and exponential functions. Emphasis is on applications, problem-solving and the appropriate use of the graphing calculator.

### OBJECTIVES

1. To learn the definitions and uses of the six trigonometric functions
2. To analyze and graph functions and their inverses
3. To review and extend topics from algebra and geometry
4. To prepare for college-level mathematics
5. To be able to use the computer and the graphing calculator as tools for solving problems

### SCOPE

- I. Functions and their graphs
  - A. Distance and midpoint formulas, including programming the calculator
  - B. Graphing, intercepts, symmetry
  - C. Functions: definition, notation, value, graphing techniques
- II. Exponential and logarithmic functions
  - A. Evaluating exponential expressions
  - B. Graphing exponential functions
  - C. Using formulas which include exponential expressions
  - D. Converting exponential to logarithmic expressions and vice versa
  - E. Base  $e$  and natural logarithms
  - F. Evaluating and graphing logarithmic functions
  - G. Solving logarithmic equations
  - H. Using logarithms to solve exponential equations
- III. Trigonometric functions
  - A. Angles and their measures
    1. Conversions: Degrees/minutes/seconds, decimal degrees, radians
    2. Area of a sector of a circle and arc length
  - B. Right triangle trigonometry
    1. Definitions of six trigonometric functions of acute angles
    2. Relationships between functions: reciprocal, quotient, cofunctions
    3. Trigonometric function values of acute angles
  - C. Trigonometric function values of general angles, using reference angles and the unit circle
  - D. Graphs of sine and cosine with amplitude, period, phase shift, vertical shift
  - E. Graphs of tangent, cotangent, secant, cosecant
- IV. Analytic Trigonometry
  - A. Inverse sine, cosine and tangent
  - B. Establishing trig identities: quotient, reciprocal, Pythagorean, even-odd

- C. Sum and difference formulas, double-angle and half-angle formulas
- D. Solving trigonometric equations
  
- V. Applications of trigonometric functions
  - A. Right-triangle trig applications
  - B. Law of the sines: SAA, ASA, SSA
  - C. Law of the cosines
  
- VI. Polar coordinates
  - A. Plotting points and graphing polar coordinate equations
  - B. Converting polar coordinates to rectangular coordinates and vice-versa

TEXT: Trigonometry: Enhanced with Graphing Utilities, Third edition, Michael Sullivan