

## PRECALCULUS

This course includes the study of polynomial, exponential and logarithmic functions and their applications in areas such as exponential growth and decay and compound interest. The concepts studied in trigonometry include basic identities and equations, solutions of triangles using the laws of sines and cosines, graphs of the trig functions, half angle and double angle formulas, and finding powers and roots of complex numbers using DeMoivre's Theorem. The graphing calculator and computer programs are used to find solutions and illustrate concepts.

### OBJECTIVES

1. To gain an understanding of polynomial functions and their application to problem solving;
2. To see the relationship between functions and their inverses and the graphing techniques involving symmetry, reflection, and translation;
3. To learn the definitions and uses of the trigonometric function;
4. To be able to use the calculator, graphing calculator, and computer as tools in problem solving;
5. To extend previously learned mathematical concepts so that the students will be prepared to take college-level courses.

### SCOPE

- I. Polynomial functions
  - A. Finding zeros
  - B. Synthetic division
  - C. Remainder and factor theorem
  - D. Graphing
  - E. Composite of functions
  - F. Determining domain and range
  - G. Inverse functions
  - H. Writing functions from verbal description
- II. Solving equations
  - A. Finding roots of any quadratic equation
  - B. Using rational root theorem to solve higher degree equations
  - C. Using computer and graphing calculators
- III. Exponents and logarithms
  - A. Simplifying and evaluating
  - B. Growth and decay

- C. Natural logarithms
- D. Solving exponential equations

#### IV. Trigonometry

- A. Angle measurement using degrees and radians
- B. Defining and finding values for the six trig functions
- C. Graphing
- D. Inverse functions
- E. Identities - simplifying and proving
- F. Solving equations
- G. Solving right triangles - angle of elevation and depression
- H. Area of triangles
- I. Deriving and using the law of sines and cosines
- J. Formulas for the sum and difference of angles and half-angle and double angles

#### V. Polar coordinates and complex numbers

- A. Graphs
- B. Powers and roots using DeMoivre's Theorem

#### VI. Graphing calculator

- A. Graphing to find solutions of 3rd and higher degree equations
- B. Graphing of the trig functions
  - 1. The six basic function - sine, cosine, tangent, cotangent, secant, cosecant
  - 2. Graphing of the sine and cosine with variations in amplitude, phase shift, period and displacement.
- C. Programming
  - 1. The quadratic formula
  - 2. The law of sines and cosines

### **TEXT**

PreCalculus Mathematics - A Graphing Approach - Scott Foresman-Addison Wesley