Precalculus 1: Analytic Geometry and Algebra

MTHH043059
Credits: 0.5 units / 5 hours | NCAA Approved

Course Description

This course provides a detailed examination of algebraic and inverse functions, graphs, exponential and logarithmic functions, conic sections, matrices, determinants, complex numbers, and discrete algebra. The textbook is recommended but optional. A graphing calculator is required for this course. The calculator listed with the course materials and its Guidebook may be purchased from ISHS. ISHS, however, will not provide specific instructions in calculator use.
NOTE: To complete this course entirely online (without Mail Processing), students will need access to a scanner. Specific instructions on how to submit projects electronically are given in the online course management system.

PREREQUISITES: Two years of algebra and one year of geometry.

1. Use set notation to define sets.
2. Solve first degree equations, inequalities, and absolute value problems, and represent the solutions on a number line.
3. Determine the domain and range of relations, and graph them on the Cartesian coordinate plane.
4. Recognize and use functional notation.
5. Graph simple functions, and use their properties to analyze additional types of functions.
6. Combine functions algebraically, and find composite and inverse functions.
7. Identify the properties of linear functions and their graphs.
8. Identify the properties of quadratic functions and their graphs.
9. Identify the equations, properties, and graphs of conic sections.
10. Find functional values, factors, and roots of polynomial functions, and sketch their graphs.
11. Identify the properties of rational functions and their graphs.
12. Use the properties of exponential and logarithmic functions to solve problems and sketch graphs.
13. Solve and graph systems of equations and problems involving inequalities.
14. Solve and use matrices and determinants.
15. Use complex numbers to solve problems.
16. Use summations notation, sequences, and the binomial theorem to evaluate expressions.
17. Recognize and use basic processes of combinations, permutations, and probability.
18. Use mathematical induction to prove equations involving summation notation.

Course Outline

Unit 1 - Fundamentals of Algebra
Lesson 1 - Sets and Real Numbers
Lesson 2 - Equations, Inequalities, and Absolute Values
Lesson 3 - Cartesian Coordinate System

Unit 2 - Functions
Lesson 4 - Functions
Lesson 5 - Graphs of Functions
Lesson 6 - Algebra of Functions

Unit 3 - Linear and Quadratic Functions And Equations
Lesson 7 - Linear Functions and Graphs
Lesson 8 - Quadratic Functions and Graphs
Lesson 9 - Conic Sections

Unit 4 - Polynomial and Rational Functions
Lesson 10 - Polynomial Functions
Lesson 11 - Polynomial Roots and Graphs
Lesson 12 - Rational Functions

Unit 5 - More Functions and Systems Of Equations
Lesson 13 - Exponential and Logarithmic Functions
Lesson 14 - Systems of Equations
Lesson 15 - Matrices and Determinants

Unit 6 - Complex Numbers and Discrete Algebra
Lesson 16 - Complex Numbers
Lesson 17 - Sequences and Sums
Lesson 18 - Binomial Theorem and Mathematical Induction

Required Materials

(available through Follett virtual bookstore at http://highschool.nebraska.bkstr.com)

TI-83+ Graphing Calculator