

High School Mathematics

Honors Algebra II

The course is designed for students who are considering a career in mathematics, science, or engineering, and are willing to devote the extra time necessary in an honors course. It will present a more thorough and conceptual approach to the topics in Algebra II. In addition, it will cover rational functions, conic section, sequence and series, and permutations and combinations. Each student will be required to have a graphing calculator (TI 83 Plus) to use for the year.

Learning Opportunities

Special projects (complex number research essay), classroom discussion, portfolio problems, group work, and work with graphing calculators

Standards

Fields of Knowledge: Mathematics, Science, Technology
Inquiry, Experimentation, and Theory

7.2 Investigation: Students design and conduct a variety of their own investigations and projects.

Mathematical Understanding

7.8 Function and Algebra Concepts: Students use function and algebra concepts.

Mathematical Problem Solving and Reasoning

7.10 Applications: Students use concrete, formal, and informal strategies to solve mathematical problems, apply the process of mathematical modeling, and extend and generalize mathematical concepts.

Content Knowledge and Skills

Basic concepts of Algebra

real numbers and their graphs

simplifying expressions

properties of real numbers

June 2004

real number operations
solving equations in one variable
problem solving with equations

Absolute value and inequalities

solving inequalities in one variable
solving combined inequalities
problem solving using inequalities
absolute value equations and inequalities

Linear equations and functions

open sentences in two variables
graphs of linear equations in two variables
the slope of a line
finding equations of a line
systems of linear equations in two variables
problem solving using systems
linear inequalities in two variables
relations
functions
linear functions

Matrices and determinants

definition of Terms
addition and scalar multiplication
matrix multiplication
applications of matrices
determinants
inverses of matrices
systems of linear equations in three variables

Products and factors of polynomials

polynomials
using laws of exponents
multiplying polynomials
using prime factorization
factoring polynomials
factoring quadratic polynomials
solving polynomial equations
problem solving with polynomial equations
solving polynomial inequalities

June 2004

Rational expressions

quotients of monomials
zero and negative exponents
scientific notation and significant digits
rational algebraic expressions
products and quotients of rational expressions
sums and differences of rational expressions
complex fractions
fractional coefficients
fractional equations

Irrational and complex numbers

roots of real numbers
properties of radicals
sums of radicals
binomials containing radicals
equations containing radicals
rational and irrational numbers
the imaginary number i
the complex numbers

Quadratic equations and functions

completing the square
the quadratic formula
the discriminant
equations in quadratic form
graphing quadratic equations
quadratic functions
writing quadratic equations and functions

Variation and polynomial equations

direct variation and proportion
inverse and joint variation
dividing polynomials
synthetic division
the remainder and factor theorems
finding rational roots
approximating irrational roots

June 2004

Exponential and log functions

rational exponents

real number exponents

composition and inverses of functions

definition of logarithms

laws of logarithms

application of logarithms

exponential growth and decay

the natural log function

Sequences and series

types of sequences

arithmetic sequences

geometric sequences

series and sigma notation

sums of arithmetic and geometric sequences

infinite geometric series

powers of binomials

binomial expansion

Assessment Criteria

Students are able to...

complete a mathematical model of a physical phenomena (7.2)

complete a historical study, tracing the development of a mathematical concept (7.2)

Resources

Text: *Algebra Structure and Method Book 2* – Brown, Dolciani, Sorgenfry, Kane (McDougal – Littel, 2001). TI-83 graphing calculators.