

Integrated Math 2, Part 1

Course Outline & Objectives

Course Description:

In Integrated Math 2, Part 1, students extend their algebraic skills through exponents, radicals, rational expressions, polynomials, quadratic functions, exponential functions, and advanced systems. They simplify and operate with algebraic expressions, factor polynomials, graph and solve quadratic equations, compare linear, quadratic, and exponential models, and analyze growth and decay. The course concludes with systems in three variables and an introduction to matrices, determinants, inverses, and matrix methods for solving systems.

Credits - One Semester (0.5 Carnegie unit / CA: 5 credits) | Prerequisites: Integrated Math 1

Course Outline

Unit 1: Exponents, Radicals, and Rational Expressions

- 1.1 Multiplication Properties of Exponents
- 1.2 Division Properties of Exponents
- 1.3 Zero and Negative Exponents
- 1.4 Perfect Squares and Cubes
- 1.5 Simplifying Radical Expressions
- 1.6 Rational and Radical Multiplication and Division
- 1.7 Rational and Radical Addition and Subtraction

Unit 2: Exponential Functions

- 2.1 Rates of Change in Exponential Functions
- 2.2 Writing and Graphing Exponential Models
- 2.3 Exponential Growth
- 2.4 Exponential Decay
- 2.5 Linear vs Exponential
- 2.6 Arithmetic Sequences
- 2.7 Geometric Sequences

Common Core Standards

In Unit 1, students will:

Apply the rules of exponents to simplify expressions with positive, zero, and negative exponents.

Simplify perfect squares, cubes, and radical expressions using various methods.

Convert between radical and rational exponent forms and perform operations with both.

Multiply, divide, add, and subtract radical and rational expressions, including binomials and conjugates.

Use exponent and radical rules to simplify and evaluate complex algebraic expressions.

[A-APR, N-RN]

In Unit 2, students will:

Identify, write, and graph exponential functions representing growth and decay.

Calculate rates of change and compare linear and exponential relationships.

Solve real-world problems using exponential models and formulas.

Analyze arithmetic and geometric sequences and write explicit formulas for each.

Distinguish between additive and multiplicative patterns in tables, graphs, and contexts.

[A-CED, A-SSE, F-IF, F-BF, F-LE]

Course Outline

Unit 3: Polynomials

- 3.1 Adding and Subtracting Polynomials
- 3.2 Multiplying Polynomials
- 3.3 Special Products of Binomials
- 3.4 Factoring by Greatest Common Factor (GCF)
- 3.5 Factoring Quadratic Trinomials
- 3.6 Factoring Special Products
- 3.7 Dividing Rational Polynomials

Unit 4: Quadratic Functions and Equations

- 4.1 Introduction to Quadratic Functions and Equations
- 4.2 Graphing Quadratic Functions
- 4.3 Solving Quadratic Equations by Graphing
- 4.4 Solving Quadratic Equations by Factoring
- 4.5 Solving Quadratic Equations by Using Square Roots
- 4.6 Solving Quadratic Equations by Completing the Square
- 4.7 The Quadratic Formula
- 4.8 The Discriminant
- 4.9 Systems of Linear-Quadratic Equations
- 4.10 Comparing Linear, Quadratic, and Exponential Models

Unit 5: Advanced Systems and Matrices

- 5.1 Systems of Equations in Three Variables
- 5.2 Matrix Operations
- 5.3 Matrix Multiplication
- 5.4 Determinants
- 5.5 Cramer's Rule
- 5.6 Inverses of 2×2 Matrices
- 5.7 Solving Systems Using Matrices

Common Core Standards

In Unit 3, students will:

Add, subtract, and multiply polynomial expressions, including using the FOIL method and special products. Apply factoring techniques such as factoring out the GCF, factoring trinomials, and recognizing special products like perfect square trinomials and differences of squares. Solve geometric problems involving area using polynomial expressions.

Divide polynomials by monomials and binomials, including factoring and simplifying rational expressions. Identify standard form, degree, leading coefficient, and classification of polynomials by terms and degree.

[A-APR, A-SSE]

In Unit 4, students will:

Add, subtract, and multiply polynomial expressions, including using the FOIL method and special products. Apply factoring techniques such as factoring out the GCF, factoring trinomials, and recognizing special products like perfect square trinomials and differences of squares. Solve geometric problems involving area using polynomial expressions.

Divide polynomials by monomials and binomials, including factoring and simplifying rational expressions. Identify standard form, degree, leading coefficient, and classification of polynomials by terms and degree.

[A-APR, A-SSE]

In Unit 5, students will:

Solve systems of linear equations in three variables using substitution and elimination.

Perform operations with matrices, including addition, subtraction, scalar multiplication, and matrix multiplication.

Calculate determinants and use Cramer's Rule to solve systems of equations.

Find the inverse of 2×2 matrices and use inverse matrices to solve systems.

Solve systems of equations using augmented matrices, Gaussian elimination, and Gauss-Jordan elimination.

[A-CED, A-REI, N-VM]