

Integrated Mathematics III / Part A

COURSE DESCRIPTION: In this third-year high school integrated math course, students encounter unified instruction reviewing and expanding all previous high school math topics. First, they extend their work on polynomials beyond quadratics to graphing, problem solving, and working with rational expressions. Next, they use statistical and probability tools, such as the standard normal distribution, to understand data. Students make inferences using simulations, experiments, and surveys. In geometry, they extend trigonometric concepts to general triangles and use trigonometric functions to model periodic processes. Finally, students substantially use mathematical modeling by making use of well-developed skills with various mathematical tools.

PREREQUISITES: Integrated Mathematics II (or equivalent)

COURSE LENGTH: One Semester

REQUIRED TEXT: Integrated Mathematics III: Reference Guide and Problem Sets

MATERIALS LIST: None

COURSE OUTLINE:

Unit 1: Randomness and Probability

- Semester 1 Introduction
- Foundations for Unit 1
- Creating Probability Distributions
- Interpreting Probability Distributions
- Binomial Distributions
- Discuss: Model vs. Experiment
- Continuous Random Variables
- The Normal Distribution
- Standardizing Data
- Comparing Scores
- The Standard Normal Curve
- Finding Standard Scores
- Core Focus: What Data Are Normal?
- Unit Review

- Unit Test

Unit 2: Sampling, Surveys, and Experiments

- Foundations for Unit 2
- Sample and Population
- Statistics and Parameters
- Interval Estimates
- The Central Limit Theorem
- Estimating Means
- Mean Differences
- Estimating Proportions
- Core Focus: Evaluating Reports
- Unit Review
- Unit Test

Unit 3: Polynomials and Series

- Foundations for Unit 3
- Working with Polynomials
- Multiplying Polynomials
- Factoring Patterns
- Solving Polynomial Equations
- Geometric Sequences
- Series and Sigma Notation
- Geometric Series
- Applications: Series
- Core Focus: Calculating Mortgage Payments
- Unit Review
- Unit Test

Unit 4: Rational and Radical Equations

- Foundations for Unit 4
- Dividing Monomials and Polynomials
- Operations with Rational Expressions 1
- Operations with Rational Expressions 2

- Solving Rational Equations
- Simplifying Radical Expressions
- Fractional Exponents and Higher Roots
- Solving Radical Equations
- Core Focus: Using Technology to Solve Equations
- Unit Review
- Unit Test

Unit 5: Operations with Polynomials

- Foundations for Unit 5
- Polynomial Long Division
- Synthetic Division
- The Polynomial Remainder Theorem
- Factors and Rational Roots
- Graphing Polynomials
- Factoring Polynomials Completely
- Factoring with Complex Numbers
- Core Focus: Polynomials and Arithmetic
- Unit Review
- Unit Test

Unit 6: Graphing Functions

- Foundations for Unit 6
- Absolute Value Functions
- Power Functions
- Reciprocal Power Functions
- Graphing Rational Functions
- Radical Functions
- Intersections of Graphs
- Core Focus: Using Technology for Graphs
- Unit Review
- Unit Test

Unit 7: Semester Review and Test

- Semester Review
- Semester Test

Integrated Mathematics III / Part B

COURSE DESCRIPTION: In this third-year high school integrated math course, students encounter unified instruction reviewing and expanding all previous high school math topics. First, they extend their work on polynomials beyond quadratics to graphing, problem solving, and working with rational expressions. Next, they use statistical and probability tools, such as the standard normal distribution, to understand data. Students make inferences using simulations, experiments, and surveys. In geometry, they extend trigonometric concepts to general triangles and use trigonometric functions to model periodic processes. Finally, students substantially use mathematical modeling by making use of well-developed skills with various mathematical tools.

PREREQUISITES: Integrated Mathematics II (or equivalent)

COURSE LENGTH: One Semester

REQUIRED TEXT: Integrated Mathematics III: Reference Guide and Problem Sets

MATERIALS LIST: None

COURSE OUTLINE:

Unit 1: Exponential and Logarithmic Functions

- Semester 1 Introduction
- Foundations for Unit 1
- Exponential Equations and Graphs
- Inverses
- Logarithms
- Properties of Logarithms
- Using Logarithms to Solve Exponential Equations
- Graphing Logarithmic Functions
- Systems with Exponential and Logarithmic Functions
- Applications: Logarithms
- Core Focus: Logarithmic Growth
- Unit Review
- Unit Test

Unit 2: Radians and Trigonometric Functions

- Foundations for Unit 2
- Right Triangle Trigonometry
- Radians and Degrees
- Angles in Standard Position
- The Unit Circle
- Trigonometric Identities
- Trigonometric Functions of Any Angle
- Inverse Trigonometric Functions
- Core Focus: Solving Trigonometric Equations
- Unit Review
- Unit Test

Unit 3: Graphs of Trigonometric Functions

- Foundations for Unit 3
- Sinusoidal Graphs
- Sinusoidal Graphs: Amplitude
- Sinusoidal Graphs: Period
- Sinusoidal Graphs: Vertical Shift
- Sinusoidal Family of Functions
- Interpreting Trigonometric Models
- Creating Trigonometric Models
- Assignment: Extended Problems: Periodicity
- Core Focus: Properties of Sinusoidal Graphs
- Unit Review
- Unit Test

Unit 4: Selecting and Modeling with Functions

- Foundations for Unit 4
- Working with Function Models
- Discuss: Domains of Function Models
- Combining Function Types
- Logistic Growth
- Comparing Models

- Adjusting Function Parameters
- Core Focus: Expressions and Models
- Unit Review
- Unit Test

Unit 5: Optimization

- Foundations for Unit 5
- Inequalities in One Variable
- Compound Inequalities
- Inequalities in Two Variables
- Systems of Linear Inequalities
- Linear Programming
- More Linear Programming
- Applications of Linear Programming
- Core Focus: Domain in Linear Programming
- Unit Review
- Unit Test

Unit 6: Modeling with Geometry

- Foundations for Unit 6
- Geometry in Space
- Geometry on Earth
- Manufacturing Problems: Design and Optimization
- Density in Two Dimensions
- Density in Three Dimensions
- Core Focus: Fermi Problems
- Unit Review
- Unit Test

Unit 7: Project: Tides Model

- Assignment: Project Research
- Project Research
- Project Writing
- Project Reflection

Unit 8: Semester Review and Test

- Semester Review
- Semester Test