

Integrated Math 3, Part 2

Course Outline & Objectives

Course Description:

In Integrated Math 3, Part 2, students extend their study of advanced functions and statistical reasoning. They analyze exponential and logarithmic functions, rational functions, and radical functions, including their graphs, equations, transformations, domains, and applications. Students develop trigonometric concepts using right triangles, radians, the unit circle, graphs, and identities. The course concludes with statistical analysis, experimental design, sampling, and inference.

Credits - One Semester (0.5 Carnegie unit / CA: 5 credits)

Prerequisites: Integrated Math 1; Integrated Math 2; Integrated Math 3, Part 1

Course Outline

Unit 1: Exponential and Logarithmic Functions

- 1.1 Exponential Growth and Decay
- 1.2 Logarithms and Logarithmic Functions
- 1.3 Properties of Logarithms
- 1.4 The Natural Base e
- 1.5 Transformations of Exponential and Logarithmic Functions
- 1.6 Solving Exponential and Logarithmic Functions
- 1.7 Modeling with Exponential and Logarithmic Functions
- 1.8 Geometric Sequences and Series

Unit 2: Rational Functions

- 2.1 Variation
- 2.2 Multiplying and Dividing Rational Expressions
- 2.3 Adding and Subtracting Rational Expressions
- 2.4 Solving Rational Equations and Inequalities
- 2.5 Graphing Rational Functions

Common Core Standards

In Unit 1 students will:

Analyze and graph exponential and logarithmic functions, including identifying key features and applying transformations.

Use properties of logarithms to simplify, expand, and condense expressions.

Solve exponential and logarithmic equations using algebraic strategies and the change of base formula.

Apply exponential and logarithmic models to real-world contexts, including compound interest, growth and decay, and regression.

Explore and evaluate geometric sequences and series, including finite and infinite cases.

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

In Unit 2 students will learn:

Recognize and model direct, inverse, and joint variation relationships in real-world and mathematical contexts.

Perform operations with rational expressions, including simplifying, multiplying, dividing, adding, and subtracting.

Solve rational equations and inequalities using algebraic methods, and interpret excluded values.

Analyze, graph, and interpret rational functions, including identifying intercepts, holes, and asymptotes.

Determine domains and ranges of rational functions and use them to understand function behavior.

[A-APR, A-REI, F-IF]

Course Outline

Unit 3: Radical Functions

- 3.1 nth Roots
- 3.2 Properties of Rational Exponents and Radicals
- 3.3 Graphing Radical Functions
- 3.4 Operations with Radical Expressions
- 3.5 Solving Radical Equations

Unit 4: Trigonometric Functions and Identities

- 4.1 Right Triangle Trigonometry
- 4.2 Angles & Radian Measure
- 4.3 The Unit Circle
- 4.4 Graphing Sine and Cosine Functions
- 4.5 Graphing Other Trigonometric Functions
- 4.6 Fundamental Trigonometric Identities
- 4.7 Sum and Difference Identities
- 4.8 Double-Angle and Half-Angle Identities

Unit 5: Statistics

- 5.1 The Normal Distribution
- 5.2 Populations, Samples and Hypotheses
- 5.3 Collecting Data
- 5.4 Experimental Design
- 5.5 Making Inferences from Sample Surveys
- 5.6 Making Inferences from Experiments

Common Core Standards

In Unit 3 students will learn:

Simplify and evaluate radical expressions, including those with variables and higher-order roots.

Convert between rational exponents and radical notation and apply exponent properties.

Graph radical functions, including square root and cube root functions, and analyze their domains, ranges, and transformations.

Perform operations with radical expressions, including addition, subtraction, multiplication, division, and rationalization.

Solve radical equations, including those with one or more radical terms, and check for extraneous solutions.

[A-REI, F-IF]

In Unit 4 students will learn:

Use the Pythagorean Theorem and properties of special right triangles to find missing side lengths.

Understand and apply the definitions of sine, cosine, and tangent in right triangles and on the unit circle.

Convert between degrees and radians, and evaluate trigonometric functions of special angles.

Graph trigonometric functions and identify characteristics of each.

Apply trigonometric identities to evaluate and simplify expressions.

[F-IF, F-TF]

In Unit 5 students will learn:

Use the normal distribution, mean, and standard deviation to analyze data.

Distinguish between populations and samples, and formulate null and alternative hypotheses for experiments and surveys.

Identify and apply appropriate sampling methods while minimizing bias in data collection.

Design and evaluate experiments using control groups, randomization, and replication, and analyze the difference between correlation and causation.

Use sample data and simulations to make inferences about treatments, proportions, and margins of error in survey and experimental settings.

[S-ID, S-IC, S-MD]