

Integrated Math 3, Part 1

Course Outline & Objectives

Course Description:

In Integrated Math 3, Part 1, students integrate geometric measurement with advanced algebra and functions. They begin by analyzing two- and three-dimensional figures, including surface area, volume, cross sections, and similar solids. Students then deepen their work with linear equations, inequalities, systems, and functions before studying quadratic and polynomial functions, complex numbers, regression, factoring, zeros, roots, and the Binomial Theorem.

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

Prerequisites: Integrated Math 1; Integrated Math 2

Course Outline

Unit 1: Solids

- 1.1 Area and Perimeter of Polygons
- 1.2 Solids, Nets, and Cross Sections
- 1.3 Surface Area of Prisms and Cylinders
- 1.4 Surface Area of Pyramids and Cones
- 1.5 Volume of Prisms and Cylinders
- 1.6 Volume of Pyramids and Cones
- 1.7 Surface Area and Volume of Spheres
- 1.8 Composite Solids
- 1.9 Similar Solids and Effects of Changing Dimensions

Unit 2: Linear Equations, Inequalities, and Systems

- 2.1 Solving Equations and Inequalities
- 2.2 Solving Absolute Value Equations and Inequalities
- 2.3 Slope and Writing Linear Equations
- 2.4 Graphing Linear Equations and Inequalities
- 2.5 Solving Systems of Equations Graphically
- 2.6 Solving Systems of Equations Algebraically
- 2.7 Solving Systems of Inequalities
- 2.8 Linear Programming

Common Core Standards

In Unit 1, students will:

Calculate the area and perimeter of 2D polygons and composite figures, including shaded regions.
Identify and classify three-dimensional solids, their nets, and cross sections.
Find surface area and volume of prisms, pyramids, cones, cylinders, and spheres.
Solve problems involving composite solids and apply formulas to calculate their surface area and volume.
Analyze the effects of scale factor on area, surface area, and volume in similar solids.
[G-GPE.B.7, G-GMD.A.1, G-GMD.A.2, G-GMD.A.3, G-GMD.B.4, G-MG.A.1, G-MG.A.2, G-MG.A.3]

In Unit 2, students will:

Solve multi-step linear equations and inequalities, including those with absolute values.
Analyze and graph linear equations and inequalities using slope, intercepts, and standard forms.
Write linear equations given points, slopes, or contextual information, and interpret parallel and perpendicular relationships.
Solve systems of equations and inequalities using graphing, substitution, and elimination methods.
Apply systems of inequalities and linear programming to optimize real-world scenarios.
[A-CED, A-REI, F-IF]

Course Outline

Unit 3: Functions

- 3.1 Functions and Continuity
- 3.2 Features of Functions
- 3.3 Sketching Graphs of Functions
- 3.4 Piecewise Functions
- 3.5 Parent Functions and Transformations
- 3.6 Operations on Functions
- 3.7 Even and Odd Functions
- 3.8 Inverse Relations and Functions

Unit 4: Quadratic Functions

- 4.1 Quadratic Functions
- 4.2 Solving Quadratic Equations by Graphing
- 4.3 Complex Numbers
- 4.4 Solving Quadratic Equations by Factoring
- 4.5 Solving Quadratic Equations by Completing the Square
- 4.6 The Quadratic Formula and the Discriminant
- 4.7 Curve Fitting with Quadratic Models
- 4.8 Quadratic Inequalities
- 4.9 Linear-Quadratic Systems

Unit 5: Polynomial Functions

- 5.1 Operations with Polynomials
- 5.2 Graphing Polynomial Functions
- 5.3 Factoring Polynomials
- 5.4 Dividing Polynomials
- 5.5 Solving Polynomial Equations by Graphing
- 5.6 Solving Polynomial Equations Algebraically
- 5.7 Zeros and Roots of Polynomial Functions
- 5.8 Pascal's Triangle and the Binomial Theorem

Common Core Standards

In Unit 3, students will:

Explore the concept of functions, including domain, range, continuity, and function notation.

Analyze function graphs to identify key features such as intercepts, extrema, intervals of increase/decrease, and end behavior.

Interpret, sketch, and transform various parent functions and piecewise-defined functions.

Perform operations with functions, including composition, and classify functions as even, odd, or neither.

Find and verify inverse functions algebraically and graphically.

[F-IF, F-BF]

In Unit 4, students will:

Analyze quadratic functions in various forms to identify key features such as vertex, axis of symmetry, and maximum or minimum values.

Solve quadratic equations using multiple methods including graphing, factoring, completing the square, and the quadratic formula.

Perform operations with complex numbers, including simplifying, adding, subtracting, multiplying, and dividing. Model real-world scenarios with quadratic functions using regression and interpret their graphs and solutions.

Graph and solve quadratic inequalities and systems involving linear and quadratic equations.

[N-CN, A-SSE, A-REI, F-IF]

In Unit 5, students will:

Perform operations with polynomials and apply exponent rules to simplify expressions.

Graph polynomial functions and analyze their end behavior, turning points, and key features.

Factor polynomials completely using a variety of techniques, including special products and factoring by grouping.

Solve polynomial equations algebraically and graphically, and interpret their solutions.

Explore the Binomial Theorem and Pascal's Triangle to expand binomial expressions and identify specific terms in expansions.

[N-CN, A-SSE, A-APR, F-IF]