

Integrated Math 2, Part 2

Course Outline & Objectives

Course Description:

In Integrated Math 2, Part 2, students develop geometric reasoning through similarity, right-triangle trigonometry, polygons, circles, and probability. They use ratios, dilations, and similarity theorems; apply the Pythagorean Theorem and trigonometric relationships; analyze properties of polygons and quadrilaterals; and solve problems involving circles and conic sections. Students conclude by using sample spaces, counting methods, probability rules, two-way tables, and conditional and geometric probability.

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

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

Course Outline

Unit 1: Similarity

- 1.1 Ratios and Proportions
- 1.2 Similar Polygons and Scale Factor
- 1.3 Dilations
- 1.4 Proving Triangles are Similar
- 1.5 Geometric Mean and Parts of Similar Triangles
- 1.6 Parallel Lines and Proportional Parts

Unit 2: Right Triangles and Trigonometry

- 2.1 Pythagorean Theorem and Its Converse
- 2.2 Special Right Triangles
- 2.3 Basic Trigonometric Functions
- 2.4 Angles of Elevation and Depression
- 2.5 Area of a Triangle
- 2.6 Law of Sines and Law of Cosines

Common Core Standards

In Unit 1, students will:

Use ratios and proportions to compare figures and solve real-world problems.

Identify similar polygons and apply scale factors to find missing side lengths.

Perform and describe dilations on and off the coordinate plane.

Prove triangles are similar using the SSS, SAS, and AA similarity theorems.

Apply geometric mean relationships and proportionality theorems within triangles, including those involving parallel lines and angle bisectors.

[G-CO.A.2, G-SRT.A.1, G-SRT.A.2, G-SRT.A.3, G-SRT.B.4, G-SRT.B.5]

In Unit 2, students will:

Use the Pythagorean Theorem and its converse to solve and classify right triangles.

Solve problems involving special right triangles (45° - 45° - 90° and 30° - 60° - 90°).

Define and apply sine, cosine, and tangent to find missing side lengths and angles in right triangles.

Solve real-world problems involving angles of elevation and depression.

Find the area of triangles using basic formulas, Heron's formula, and trigonometric methods, including the Laws of Sines and Cosines.

[G-SRT.C.6, G-SRT.C.7, G-SRT.C.8, G-SRT.D.9, G-SRT.D.10, G-SRT.D.11]

Course Outline

Unit 3: Polygons and Quadrilaterals

- 3.1 Classifying Polygons
- 3.2 Polygon Theorems
- 3.3 Parallelograms
- 3.4 Rectangles, Rhombuses, and Squares
- 3.5 Trapezoids and Kites
- 3.6 Quadrilaterals on a Coordinate Plane
- 3.7 Constructing Regular Polygons

Unit 4: Circles

- 4.1 Central Angles, Chords, and Arcs
- 4.2 Inscribed Angles and Inscribed Polygons
- 4.3 Tangent Lines and Circumscribed Polygons
- 4.4 Chords, Secants, and Tangents
- 4.5 Area and Circumference of a Circle
- 4.6 Arc Length and Areas of Circle Sectors and Segments
- 4.7 Equations of Circles
- 4.8 Introduction to Conic Sections

Unit 5: Probability

- 5.1 Sample Spaces
- 5.2 Probability and Counting
- 5.3 Geometric Probability
- 5.4 Two-Way Frequency Tables
- 5.5 Probability and the Addition Rule
- 5.6 Probability and the Multiplication Rule
- 5.7 Conditional Probability
- 5.8 Probability with Permutations and Combinations

Common Core Standards

In Unit 3, students will:

Classify polygons and apply properties of interior and exterior angles in regular and irregular polygons. Identify and use properties of special quadrilaterals, including parallelograms, rectangles, rhombuses, squares, trapezoids, and kites.

Use coordinate geometry to verify and classify quadrilaterals on the coordinate plane using slope, distance, and midpoint formulas.

Solve problems involving midsegments, angles, and sides in trapezoids and kites.

Construct regular polygons using a compass and straightedge.

[G-CO.A.3, G-CO.C.11, G-CO.D.13, G-GPE.B.4]

In Unit 4, students will:

Identify and use properties of circles, including central angles, arcs, chords, tangents, and secants.

Apply theorems related to inscribed angles, tangent lines, and intersecting lines to solve problems.

Calculate circumference, area, arc length, and sector area of circles, both in standard form and on the coordinate plane.

Write and graph equations of circles and prove similarity between circles using algebraic and geometric reasoning.

Explore basic features and equations of conic sections, including ellipses, parabolas, and hyperbolas.

[G-CO.A.1, G-C.A.1, G-C.A.2, G-C.A.3, G-C.A.4, G-C.B.5, G-GPE.A.1, G-GPE.A.2, G-GPE.A.3, G-GPE.B.4]

In Unit 5, students will:

Explore sample spaces, set notation, and Venn diagrams to represent and calculate probabilities.

Compare theoretical and experimental probability, and use probability to predict outcomes.

Apply the addition and multiplication rules to both independent and dependent events.

Analyze two-way frequency tables and calculate conditional probabilities.

Use permutations, combinations, and geometric probability to solve advanced probability problems.

[S-CP.A.1, S-CP.A.2, S-CP.A.3, S-CP.A.4, S-CP.A.5, S-CP.B.6, S-CP.B.7, S-CP.B.8, S-CP.B.9, S-MD.A.2, S-MD.A.3, S-MD.B.5]