



GEOMETRY

2021 – 2022

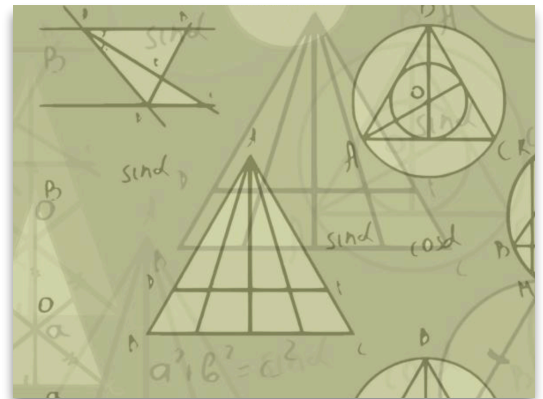
Syllabus

Geometry is the study of figures in space in a given number of dimensions. The most common types of geometry are plane geometry (points, lines, circles, triangles, and polygons), solid geometry (spheres and polyhedron), and spherical geometry (spherical triangle and spherical polygon). The study of geometry proceeds from a small number of accepted truths (axioms or postulates), and then builds up true statements using a systematic and rigorous step-by-step proof process. However, there is much more to geometry than this relatively dry textbook approach. We will explore both sides of Geometry - the rigorous mathematical interpretation as well as the beautiful esoteric side. The rigorous computation side of Geometry will prepare you for advanced courses like Calculus or Computer Science. Through short and long term projects, you will be given the opportunity to express your creative side through drawings, constructions, and class presentations (Prezis, PowerPoints, Keynotes, Google Slides, etc.).

Unit I: The Foundations of Geometry

- I.1: Measuring Segments and Angles
- I.2: Basic Constructions
- I.3: Midpoint and Distance
- I.4: Inductive Reasoning
- I.5: Conditional Statements
- I.6: Deductive Reasoning
- I.7: Writing Proofs

Project: Constructions



The Foundations Of Geometry

Unit 2: Parallel and Perpendicular Lines

- 2.1: Properties of Parallel Lines
- 2.2: Proving Lines Parallel
- 2.3: Parallel Lines and Triangles
- 2.4: Slopes of Parallel and Perpendicular Lines

Project: These City Streets

& Perpendicular Parallel

Unit 3: Transformations

- 3.1: Reflections
- 3.2: Translations
- 3.3: Rotations
- 3.4: Classifications of Rigid Motion
- 3.5: Symmetry

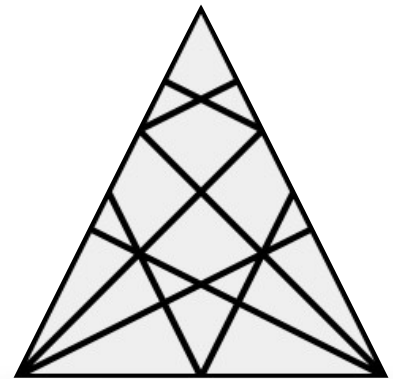
Project: Analyzing Logos



Unit 4: Triangle Congruence

- 4.1: Congruence
- 4.2: Isosceles and Equilateral Triangles
- 4.3: Triangle Congruence by SSS and SAS
- 4.4: Triangle Congruence by ASA and AAS
- 4.5: Congruence in Right Triangles
- 4.6: Congruence in Overlapping Triangles

Project: Penrose Triangle



Unit 5: Relationships Within Triangles

- 5.1: Perpendicular and Angle Bisectors
- 5.2: Bisectors in Triangles
- 5.3: Medians and Altitudes
- 5.4: Inequalities in One Triangle
- 5.5: Inequalities in Two Triangles

Project: Quod Erat Demonstrandum (Q.E.D.)



Unit 6: Polygons and Quadrilaterals

- 6.1: Polygon-Angle Sum Theorems
- 6.2: Kites and Trapezoids
- 6.3: Properties of Parallelograms
- 6.4: Proving That a Quadrilateral Is a Parallelogram
- 6.5: Properties of Rhombuses, Rectangles, and Squares
- 6.6: Properties of Special Parallelogram
- 6.7: Conditions of Special Parallelograms

Project: e pluribus unum



POLYGON

Unit 7: Similarity

- 7.1: Dilations
- 7.2: Similarity Transformations
- 7.3: Proving Triangles Similar
- 7.4: Similarity in Right Triangles
- 7.5: Proportions in Triangles

Project: Golden Mean



Unit 8: Right Triangles and Trigonometry

- 8.1: Right Triangles and the Pythagorean Theorem
- 8.2: Trigonometric Ratios
- 8.3: The Law of Sines
- 8.4: Law of Cosines
- 8.5: Problem Solving with Trigonometry

Project: Tools of the Trade



Unit 9:Coordinate Geometry

- 9.1: Polygons in the Coordinate Plane
- 9.2: Proofs Using Coordinate Geometry
- 9.3: Circles in the Coordinate Plane
- 9.4: Parabolas in the Coordinate Plane

Project: Coordinates



Unit 10:Circles

- 10.1: Arcs and Sectors
- 10.2: Tangent Lines to A Circle
- 10.3: Chords
- 10.4: Inscribed Angles
- 10.5: Secant Lines and Segments

Project: Locus of Control



Unit 11:Two- and Three-Dimensional Models

- 11.1: Space Figures and Cross Sections
- 11.2: Volumes of Prisms and Cylinders
- 11.3: Pyramids and Cones
- 11.4: Spheres

Project: Looking for Space



Unit 12:Probability

- 12.1: Probability Events
- 12.2: Conditional Probability
- 12.3: Permutations and Combinations
- 12.4: Probability Distributions
- 12.5: Expected Value
- 12.6: Probability and Decision Making

Project: Odds and Ends

probability