

Geometry (High School Math)

Course Curriculum (MPSL Academy)

Each Session: 1 hour 15 minutes

(First 10 min review of last week topics/HW, 50 min new topics, 15 min critical thinking Qs)

1. Basics of Geometry

- Points, Lines, and Planes
- Measuring and Constructing Segments
- Using Midpoint and Distance Formulas
- Perimeter and Area in the Coordinate Plane
- Measuring and Constructing Angles
- Describing Pairs of Angles

2. Reasoning and Proofs

- Conditional Statements
- Inductive and Deductive Reasoning
- Postulates and Diagrams
- Algebraic Reasoning
- Proving Statements about Segments and Angles
- Proving Geometric Relationships

3. Parallel and Perpendicular Lines

- Pairs of Lines and Angles
- Parallel Lines and Transversals
- Proofs with Parallel Lines
- Proofs with Perpendicular Lines
- Equations of Parallel and Perpendicular Lines

4. Transformations

- Translations
- Reflections & Rotations
- Congruence and Transformations
- Dilations
- Similarity and Transformations

5. Congruent Triangles

- Angles of Triangles
- Congruent Polygons
- Proving Triangle Congruence by SAS & SSS
- Equilateral and Isosceles Triangles
- Proving Triangle Congruence by ASA and AAS
- Using Congruent Triangles
- Coordinate Proofs

6. Relationships Within Triangles

- Perpendicular and Angle Bisectors
- Bisectors of Triangles
- Medians and Altitudes of Triangles
- The Triangle Midsegment Theorem
- Indirect Proof and Inequalities in One Triangle
- Inequalities in Two Triangles

7. Quadrilaterals and Other Polygons

- Angles of Polygons
- Properties of Parallelograms
- Proving That a Quadrilateral is a Parallelogram
- Properties of Special Parallelograms
- Properties of Trapezoids and Kites

8. Similarity

- Similar Polygons
- Proving Triangle Similarity by AA
- Proving Triangle Similarity by SSS and SAS
- Proportionality Theorems

9. Right Triangles and Trigonometry

- The Pythagorean Theorem
- Special & Similar Right Triangles
- The Tangent Ratio
- The Sine and Cosine Ratios
- Solving Right Triangles
- Law of Sines and Law of Cosines

10. Circles

- Lines and Segments That Intersect Circles
- Finding Arc Measures
- Using Chords
- Inscribed Angles and Polygons
- Angle Relationships in Circles
- Segment Relationships in Circles
- Circles in the Coordinate Plane

11. Circumference, Area, and Volume

- Circumference and Arc Length
- Areas of Circles and Sectors
- Areas of Polygons
- Three-Dimensional Figures
- Volumes of Prisms and Cylinders

- Volumes of Pyramids
- Surface Areas and Volumes of Cones
- Surface Areas and Volumes of Spheres

12. Probability

- Sample Spaces and Probability
- Independent and Dependent Events
- Two-Way Tables and Probability
- Probability of Disjoint and Overlapping Events
- Permutations and Combinations
- Binomial Distributions

13. ADVANCE TOPICS

- **PROPORTIONS**
- **GEOMETRIC MEAN**
- **CIRCLES, ARCS, TANGENTS**
- **VECTORS & LOCUS**
- **POLYGONS, POLYHEDRA (3-DIMENTIONAL SHAPES)**
- **REASONING AND PROOFS**
- **USING THE DISTANCE FORMULA TO WRITE AN EQUATION**
- **STANDARD EQUATIONS OF A PARABOLA WITH VERTEX AT THE ORIGIN**
- **GRAPHING AN EQUATION OF A PARABOLA**
- **STANDARD EQUATIONS OF A PARABOLA WITH VERTEX AT (H, K)**
- **SOLVING REAL-LIFE PROBLEMS**

NOTE: STUDENTS WILL PARTICIPATE IN VARIOUS STATE & NATIONAL LEVEL MATH COMPETITIONS LIKE MATHCOUNTS, MATH OLYMPIAD, MATH KANGAROO, CONTINENTAL MATH LEAGUE AND SO ON. OUR GOAL IS TO BUILD CONFIDENCE IN MATH IN AN EFFICIENT WAY RESULTING IN IMPROVING SCORES IN SCHOOL EXAM & SUCCEED IN NATIONAL/INTERNATIONAL MATH COMPETITIONS.