

**Villa Maria Academy
Mathematics Department
Topics for Geometry Placement Test**

Understand basic terms of Geometry:

- Equidistant, point, line, plane, collinear, non-collinear, coplanar, intersection. segment, ray, distance, midpoint, bisector, congruent

Use proper Geometric notation

Ability to read and interpret a plane or three-dimensional figure

Apply the Definitions, Postulates and Theorems relating to all of the Geometry Topics

Segment and Angle Addition

Angles – Definition and Type

Deductive Reasoning

- Write an If – Then statement
- Conditional and bi-conditional statements
- Write converse, inverse and contrapositive statements

Properties of Algebra

- Properties of Equality plus substitution, reflexive, symmetric and transitive properties

Plan and Write a Two-Column Proof

Perpendicular, Parallel and Skew lines

- Problem solving with perpendicular and parallel lines
- Types of angles formed by 2 parallel lines and transversal lines
- Ways to prove lines parallel

Triangles

- Classify by sides (scalene, isosceles, equilateral) and by angles (acute, obtuse, right, equiangular)
- Sum of measures of angles in a triangle

Congruent Triangles

- Methods of proving triangles congruent (SSS, SAS, ASA, AAS, HL)
- Prove segments/angles of triangles congruent
- Show corresponding parts of congruent triangles are congruent
- Isosceles Triangle Theorem and Converse
- Medians, altitudes, perpendicular bisectors

Polygons

- Triangles, Quadrilaterals, Pentagon, Hexagon, Octagon, Decagon

- Find the sum of measures of interior and exterior angles
- Find the measure of each interior and exterior angle in a regular polygon

Quadrilaterals (Parallelograms, Rectangles, Rhombuses, Squares, and Trapezoids) and their properties

Inequalities

- Properties of inequalities
- Exterior Angle Theorem
- Triangle Inequality Theorem
- Indirect proofs
- Inequalities in one and two triangles

Ratios and Proportions

Similar Polygons/Triangles

- AA Similarity Postulate
- SAS and SSS Similarity Theorems

Right Triangles

- Simplify and rationalize radicals
- Right triangle similarity
- Geometric mean
- Pythagorean Theorem and its converse
- Pythagorean Triples
- $45^\circ - 45^\circ - 90^\circ$ and $30^\circ - 60^\circ - 90^\circ$ triangles and their side relationships
- Trigonometric ratios (sine, cosine, tangent)

Circles

- Arcs, chords, tangents and secants, and the angles formed by them
- Central angles, inscribed angles and measure of an arc
- Lengths of chords, tangents and secants in a circle

Area Formulas for Plane Figures

- Rectangle, square, rhombus, parallelogram, triangle, regular polygons, trapezoid, sector
- Circles (Area and Circumference)

Area (Lateral and Total) and Volume of Solids (formulas need not be memorized)

- Prisms, Pyramids, Cylinders, Cones, Spheres