

# **Saint Joseph High School Summer Institute Geometry**

Textbook: Prentice Hall Mathematics: Geometry

## **Week One**

### **Chapter 1 (Tools of Geometry)**

- Points, lines, planes
- Segments, rays, parallel lines and planes
- Measuring Segments
- Measuring angles
- The Coordinate Plane

### **Chapter 2 (Reasoning and Proof)**

- Conditional Statements
- Biconditionals and definitions
- Deductive reasoning
- Inverses and Contrapositives (5-4)
- Reasoning in algebra
- Proving angles congruent

### **Chapter 3 (Parallel and Perpendicular Lines)**

- Properties of parallel lines
- Proving lines parallel
- Parallel and Perpendicular Lines
- Triangle angle-sum theorem
- Polygon angle-sum theorem
- Lines in the Coordinate Plane
- Slopes of Parallel and Perpendicular Lines

## **Week Two**

### **Chapter 4 (Congruent Triangles)**

- Congruent figures
- Triangle congruence
- (SSS, SAS, ASA, AAS, HL)
- Congruent parts of congruent triangles are congruent (CPCTC)
- Isosceles and Equilateral Triangles
- Congruence in right triangles

### **Chapter 5 (Relationships within triangles)**

- Midsegments
- Angle and perpendicular bisectors
- "Centers" of triangles
- Inequalities in triangles

### **Chapter 7 (Part One: Right triangles)**

- Pythagorean theorem and its converse
- Special Right Triangles
- Geometric Probability

## **Week Three**

### **Chapter 6 (Quadrilaterals)**

- Classifying
- Properties of parallelograms
- Proving parallelograms
- Special parallelograms
- Trapezoids and kites
- Coordinate geometry proofs

### **Chapter 7 (Part Two: Area of circles/polygons)**

- Perimeter and basic area (1-7)
- Area of parallelograms and triangles
- Area of trapezoids, rhombuses, and kites
- Area of regular polygons

### **Chapter 8 (Similarity)**

- Ratios and proportions
- Similar polygons
- Proving triangles similar
- Similarity in right triangles
- Proportions in triangles
- Perimeter and area of similar figures

### **Chapter 9 (Right Triangle Trigonometry)**

- The tangent ratio
- Sine and cosine ratios
- Angles of elevation and depression
- Trig and area

### **Chapter 7 (Part Three and Circles Part One)**

- Circles and arcs
- Area of sectors
- Area of segments
- Equations of circles

## **Week Four**

### **Chapter 11 (Circles part 2)**

- Tangent Lines
- Chords and arcs
- Inscribed Angles
- Angle Measures and Segment Lengths
- Locus: A set of points

### **Chapter 10 (Surface Area and Volume)**

- Space figures and nets/drawings
- Surface area of prisms and cylinders
- Surface area of pyramids and cones
- Volumes of Prisms and Cylinders
- Volumes of Pyramids and Cones
- Surface Areas and Volumes of Spheres
- Areas and Volumes of Similar Solids

### **Additional Topics (If time permits)**

- All transformations
- Symmetry
- Tessellations
- Vectors
- More advanced proofs