

# **Geometry – 10<sup>th</sup> grade**

## **1. Advanced Introduction to Geometry**

- . Review of Key Concepts: Points, lines, planes, and angles.**
- . Applications in Architecture, Engineering, and Technology.**

## **2. Advanced Polygons and Angle Theorems**

- . Polygon Angle Sum: Sum of interior angles of an  $n$ -sided polygon =  $(n - 2) \times 180^\circ$ .**
- . Exterior Angles: Sum of exterior angles =  $360^\circ$ .**

- . Regular Polygons: Properties of regular polygons and angle calculations.**
- . Angle Theorems: Central angle and inscribed angle theorems.**

### **3. Advanced Perimeter, Area, and Surface Area**

- . Irregular Polygons: Using decomposition to find perimeter and area.**
- . Surface Area of Complex Solids: Combining cylinders, cones, and spheres.**
- . Arc Length and Sector Area: Calculating arc length and sector area of circles.**

## **4. Volume and Surface Area of 3D Solids**

- . Solids of Revolution: Volume and surface area of solids generated by rotating 2D shapes.**
- . Pyramids and Cones: Volume and surface area formulas.**
- . Composite Solids: Problems involving combined 3D shapes.**

## **5. Coordinate Geometry**

- . Distance Formula: Calculating distance between two points.**
- . Midpoint Formula: Finding the midpoint between two points.**
- . Equation of a Line: Slope-intercept and point-slope form.**

- **Circle Equation: Standard equation of a circle:**  $(x-h)^2 + (y-k)^2 = r^2$   $(x-h)^2 + (y-k)^2 = r^2$

## **6. Trigonometry and Right Triangles**

- **Trigonometric Ratios: Sine, Cosine, Tangent in right triangles.**
- **Solving Triangles: Finding missing sides and angles using trigonometric functions.**
- **Application of Trigonometry: Solving real-world problems (e.g., height and distance problems).**

## **7. Theorems in Circles**

- **Chord and Tangent Theorems: Properties of tangents and chords.**

- . Inscribed Angle Theorem:  
Relationships between angles, arcs,  
and chords in a circle.**

## **8. Transformations and Rigid Motions**

- . Translation, Rotation, Reflection:  
Properties and applications in the  
coordinate plane.**
- . Dilations and Similarity: Scale factor  
and center of dilation in similar  
figures.**

## **9. Proofs and Logical Reasoning**

- . Geometric Proofs: Writing proofs for  
theorems involving triangles,  
quadrilaterals, and circles.**
- . Indirect Proofs: Using proof by  
contradiction in geometry.**

## **10. Summary and Review**

- . Quick Recap: Review key concepts like transformations, trigonometry, and theorems.**
- . Q&A Session: Address any questions or challenges.**
- . Challenge Problems: Multi-step problems combining multiple concepts.**
- . Homework: Practice problems on advanced concepts, including proofs, 3D solids, and trigonometry.**

## **11. Assessment**

- . In-Class Quiz: Challenging questions covering all topics.**

- . Homework: Complete problems on advanced topics like volume, surface area, and transformations.**