

## **SSC GD Constable Exam : Geometry Syllabus Summary**

### **Overview:**

The Geometry topic is an important part of the Mathematics section in the SSC GD Constable Exam, contributing approximately 2–4 questions (4–8 marks out of 160 total marks) in the Computer-Based Examination (CBE). The syllabus focuses on understanding properties of 2D shapes, angles, triangles, circles, and their applications in solving geometric problems. Questions test conceptual understanding, formula application, and problem-solving skills at a 10th-grade level. The exam includes 80 questions (2 marks each, 0.50 negative marking per wrong answer) to be completed in 60 minutes.

### **Key Topics in Geometry:**

1. Lines and Angles: Properties of angles, parallel lines, and transversals.
2. Triangles: Types, properties, congruence, and similarity of triangles.
3. Circles: Properties of circles, chords, tangents, and arcs.
4. Quadrilaterals: Properties of squares, rectangles, parallelograms, and trapeziums.
5. Polygons: Basic properties and angle calculations.
6. Perimeter and Area: Calculating boundaries and areas of 2D shapes (overlaps with Mensuration).
7. Word Problems: Real-world applications (e.g., fencing, tiling, geometric constructions).
8. Coordinate Geometry: Basic concepts of coordinates and distance formula (if included at SSC GD level).

### **Important Formulas and Theorems:**

1. Lines and Angles:
  - Sum of angles on a straight line =  $180^\circ$ .
  - Sum of angles around a point =  $360^\circ$ .
  - Corresponding angles are equal for parallel lines cut by a transversal.
  - Alternate interior angles are equal for parallel lines.

- Example: If a transversal cuts parallel lines and one angle is  $70^\circ$ , corresponding angle =  $70^\circ$ , alternate interior angle =  $70^\circ$ .

## 2. Triangles:

- Angle Sum Theorem: Sum of angles in a triangle =  $180^\circ$ .

- Example: If two angles are  $50^\circ$  and  $60^\circ$ , third angle =  $180 - (50 + 60) = 70^\circ$ .

- Exterior Angle Theorem: Exterior angle = Sum of opposite interior angles.

- Example: Exterior angle =  $50^\circ + 60^\circ = 110^\circ$ .

- Pythagoras Theorem (for right-angled triangles):  $a^2 + b^2 = c^2$  (c = hypotenuse).

- Example: Sides 3 cm, 4 cm, Hypotenuse =  $\sqrt{(3^2 + 4^2)} = \sqrt{25} = 5$  cm.

- Congruence Criteria: SSS, SAS, ASA, AAS, RHS.

- Example: Two triangles with sides 3, 4, 5 cm are congruent by SSS.

- Similarity Criteria: AA, SSS, SAS.

- Example: Triangles with angles  $30^\circ$ ,  $60^\circ$  and proportional sides are similar by AA.

## 3. Circles:

- Circumference =  $2\pi r$ , Area =  $\pi r^2$  (r = radius).

- Example: r = 7 cm, Circumference =  $2 \times (22/7) \times 7 = 44$  cm, Area =  $(22/7) \times 7^2 = 154$  cm<sup>2</sup>.

- Angle in a semicircle =  $90^\circ$ .

- Equal chords subtend equal angles at the center.

- Perpendicular from center to a chord bisects the chord.

- Example: If chord length = 8 cm and perpendicular from center bisects it, each segment = 4 cm.

## 4. Quadrilaterals:

- Rectangle: Area = length  $\times$  breadth, Perimeter =  $2(\text{length} + \text{breadth})$ .

- Example: Length = 6 cm, Breadth = 4 cm, Area =  $6 \times 4 = 24$  cm<sup>2</sup>.

- Square: Area = side<sup>2</sup>, Perimeter =  $4 \times \text{side}$ .

- Example: Side = 5 cm, Area =  $5^2 = 25$  cm<sup>2</sup>.

- Parallelogram: Area = base  $\times$  height, Perimeter = 2(base + adjacent side).
- Example: Base = 5 cm, Height = 3 cm, Area =  $5 \times 3 = 15 \text{ cm}^2$ .
- Trapezium: Area =  $(1/2) \times (\text{sum of parallel sides}) \times \text{height}$ .
- Example: Parallel sides 4 cm, 6 cm, Height = 3 cm, Area =  $(1/2) \times (4 + 6) \times 3 = 15 \text{ cm}^2$ .

## 5. Polygons:

- Sum of interior angles =  $(n - 2) \times 180^\circ$  ( $n$  = number of sides).
- Example: Pentagon ( $n = 5$ ), Sum =  $(5 - 2) \times 180^\circ = 540^\circ$ .
- Each interior angle of a regular polygon =  $[(n - 2) \times 180^\circ] / n$ .
- Example: Regular pentagon, Each angle =  $(540^\circ / 5) = 108^\circ$ .

## 6. Coordinate Geometry (Basic):

- Distance Formula: Distance between  $(x_1, y_1)$  and  $(x_2, y_2) = \sqrt{[(x_2 - x_1)^2 + (y_2 - y_1)^2]}$ .
- Example: Distance between (1, 2) and (4, 6) =  $\sqrt{[(4 - 1)^2 + (6 - 2)^2]} = \sqrt{(9 + 16)} = \sqrt{25} = 5 \text{ units}$ .
- Midpoint Formula: Midpoint =  $[(x_1 + x_2)/2, (y_1 + y_2)/2]$ .
- Example: Midpoint of (1, 2) and (3, 4) =  $[(1 + 3)/2, (2 + 4)/2] = (2, 3)$ .

## 7. Word Problem Applications:

- Example (Triangle): A triangle with sides 6 cm, 8 cm, 10 cm is right-angled ( $6^2 + 8^2 = 36 + 64 = 100 = 10^2$ ). Area =  $(1/2) \times 6 \times 8 = 24 \text{ cm}^2$ .
- Example (Fencing): Perimeter of a rectangular field  $10 \text{ m} \times 6 \text{ m} = 2(10 + 6) = 32 \text{ m}$ . Cost at ₹5/m =  $32 \times 5 = ₹160$ .

## **Key Points for SSC GD Preparation:**

- Focus Areas: Properties of triangles, circles, angles, and calculating perimeters/areas are frequently tested, along with word problems (e.g., fencing, tiling).
- Question Types: Direct calculations (e.g., area of a triangle), angle properties, congruence/similarity, and word problems (e.g., cost of fencing a field).

- Difficulty Level: 10th-grade level, requiring accurate formula application and understanding of geometric properties.
- Practice Tips: Memorize key theorems (e.g., Pythagoras, angle sum), practice congruence/similarity problems, and solve word problems from past SSC GD papers.

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