

CLASS 9 MATHS – CHAPTER 5

INTRODUCTION TO EUCLID'S GEOMETRY – ALL FORMULAE

Euclid's Definitions

- **Point:** That which has no part.
- **Line:** Breadthless length.
- **Ends of a line:** Points.
- **Straight line:** A line which lies evenly with the points on itself.
- **Surface:** That which has length and breadth only.
- **Edges of a surface:** Lines.
- **Plane surface:** A surface which lies evenly with the straight lines on itself.

Euclid's Five Postulates

- **Postulate 1** - A straight line may be drawn from any one point to any other point.
- **Postulate 2** - A finite straight line may be extended indefinitely in a straight line.
- **Postulate 3** - A circle can be drawn with any center and any radius.
- **Postulate 4** - All right angles are equal to one another.
- **Postulate 5** - If a straight line falling on two straight lines makes the interior angles on the same side less than two right angles, then the two lines, if produced indefinitely, meet on that side.

Axioms vs Postulates

- **Axioms**
 - Universal truths
 - Used in all mathematics
- **Postulates**
 - Geometry-specific assumptions
 - Related to shapes and space

Reasoning System Used

- Euclid's geometry is based on **deductive reasoning**.
- Definitions + axioms + postulates
 - theorems.

Statements Acting as "Identities"

- Number of formulae in this chapter: **ZERO**
- Number of core concepts: **DEFINITIONS, AXIOMS, POSTULATES**
- Highly important for proofs in later chapters

Final Summary For Students

- Only **one straight line** can pass through two distinct points.
- Two distinct lines cannot have more than one point in common.
- A circle is uniquely determined by its **center and radius**.
- All right angles are equal (used as a standard for angle comparison).

Euclid's Axioms

- **Axiom 1:** Things equal to the same thing are equal.
- **Axiom 2:** Equals added to equals give equals.
- **Axiom 3:** Equals subtracted from equals give equals.
- **Axiom 4:** Things that coincide are equal.
- **Axiom 5:** The whole is greater than the part.
- **Axiom 6:** Doubles of the same things are equal.
- **Axiom 7:** Halves of the same things are equal.