

CHAPTER-5

INTRODUCTION TO EUCLID'S GEOMETRY

KEY POINTS

- **Introduction** : Euclidean geometry, which is taught today is named after Euclid - he is known as "the father of geometry". Euclid also studied and contributed in other areas of mathematics, including number theory and astronomy.
- **Axiom or Postulates** : Axiom or Postulates are the assumptions which are obvious universal truths. They are not proved.
- **Theorems** : Theorems are statements which are proved using definitions, axioms, previously proved statements and deductive reasoning.

SOME OF EUCLID'S AXIOMS

1. Things which are equal to the same thing are equal to one another.
2. If equals are added to equals the whole are equal.
3. If equals are subtracted from equals the remainders are equal.
4. Things which coincide with one another are equal to one another.
5. The whole is greater than the part.
6. Things which are double of the same things are equal to one another.
7. Things which are halves of the same things are equal to one another.

EUCLID'S POSTULATES AND DEFINITIONS

- **Postulates 1** : A straight line may be drawn from any one point to any other points.
- **Postulate 2** : A terminated line can be produced indefinitely.
- **Postulate 3** : A circle can be drawn with any centre 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 of it taken together less than two right

angles, then two straight lines if produced indefinitely, meet on that side on which the sum of angles is less than two right angles.

DEFINITIONS

1. A Point is that which has no part.
2. A line is breadth less length.
3. The ends of a line are points.
4. A straight line is a line which lies evenly with the points on it self.
5. A surface is that which contain length and breadth only.
6. The edges of a surface are lines.
7. A plane surface is a surface which lies evenly with the straight lines on it self.
8. Two distinct lines can not have more than one point in common.