Introduction to Euclid's Geometry

Exercise 5.1

Q. Give a definition for each of the following terms. Are there other terms that need to be defined first? What are they, and how might you define them?

(i) Parallel lines

The lines in a plane are said to be parallel if they do not have a common point.

(ii) Perpendicular lines

Two lines when intersect with each other and make 90° at the point of intersection.

(iii) Line segment

The connected part (segment) of the line with end.

(iv) Radius of a circle

The lines from the centre to the circumference and forms a circle is called radius of circle

(v) Square

A quadrilateral whose all sides equal and all angles are 90°.

3. Consider two 'postulates' given below:

(i) Given any two distinct points A and B, there exists a third point C which is in between A and B.

⇒ It says that two distinct points A and B, there is a third point C which lies in between them.

(ii) There exist at least three points that are not on the same line.

⇒ It says that given A and B, but we can take C not lying on the line through A and B.

These 'postulates' do not follow from Euclid's postulates. However, they follow Axioms.

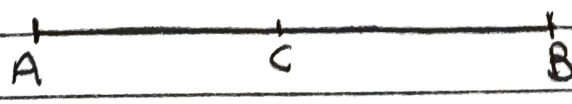
4. If a point C lies between two points A and B such that AC = BC, then prove that AC = 1/2 AB. Explain by drawing the figures.

⇒ AC = BC; $AC = \frac{1}{2}AB$

AB = AC + BC

⇒ AB = AC + AC ⇒ AB = 2AC

⇒ $AC = \frac{AB}{2}$ = 1/2 AB



Exercise 5.2

1. How would you rewrite Euclid's fifth postulate so that it would be easier to understand?

→ If a line intersect 2 lines such that sum of int. angles on the same side of the transversal is less than 180°. When the lines are produced on that side they will intersect each other at one point.

2. Does Euclid's fifth postulate imply the existence of parallel ~~sides~~ lines? Explain.

→ Yes

If a line intersect 2 lines such that sum of two angles on the same side of the transversal is 180° Then the distance between the 2 lines will always remain same.

i.e., the lines are parallel.