Euclid's Geometry

Geo (Earth) — metrin (measurement)

Thales

Euclid's ← Maths → Element → 13 chapter (book)

outer boundary — surface

Which can't be proved → Axioms ↑ Universal Truth

Postulates → axioms → specifically for geometry

(1) Things which are equal to the same thing are equal to one another.
(2) If equals are added to equals, the wholes 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.

AB = BC BC = CA
AB = CA

$10 = 10$
$10 + 1 = 10 + 1$

$10 = 10$
$10 - 1 = 10 - 1$

Dome = Dome
Dome = Sqr

NCERT science book-9

10 Rs = 10 Rs
2 × 10 = 2 × 10
20 = 20

$\frac{10Rs}{2} = \frac{10Rs}{2}$
5 Rs = 5 Rs

Euclid's Five postulates

Postulate 1

P — Q

Postulate 2

A — B
line segment
↑ Terminated line

Postulate 3

Postulate 4

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

$\angle 2 \times 90°$
$\angle 180°$

A point is that which has no part

Something which occupies area.

(i) parallel lines – Two lines x & y in a plane are said to be parallel if they have no point in common.

(ii) Perpendicular lines :- Two lines x and y in a plane are said to be perpendicular lines if they intersect each other at right angles

360°

1/4 th part of a revolution makes angle 90° & that angle is called right angle

(iii) line segment – A straight path b/w two point A and B is called line segment AB

A — B

(iv) Radius – line joining the center of a circle to any point on the circle is called radius of the circle.

→ A circle is a collection of all points which are equidistant from fixed point & that fixed point is known as center of circle.
& distance b/w that fixed point & any point on the circle is called radius

Square :- Square is a rectangle with all sides equal.

rectangle is parallelogram where opposite sides are equal & each angle 90°

Some Undefine terms

– "A point is that which has no part"

Point – A point is represented by a fine dot made by a sharp pencil on a sheet of paper
↑ Not a defn, its an example

Plane – Surface of a smooth wall or the surface of a paper etc are close example of plane.

Line – If we fold a piece of paper, the crease in paper represent a geometrical line, the edge of a ruler etc.

3
(i) A — C — B
(ii) B — C — B

(i) point, line
(ii) Yes, as one situation is contradicting other situation.
they follow Axiom 5.)

4)
A — C — B

Given :- AC = BC
To prove AC = ½ AB

Proof :- According to Axiom 5, whole is greater than the part

AB = AC + BC
AB = AC + AC (Given AC = BC)
AB = 2AC
AC = ½ AB

5)
A — C — D — B

Given :- C is a midpoint
Proof :- Let D is a midpoint of AB

$AD = \frac{1}{2}AB$ —(i)
Given $AC = \frac{1}{2}AB$ (ii)

Subtract (ii) from (i)
AD − AC = 0
AD = AC

This is possible only when point D lies on point C
∴ C is only mid point.