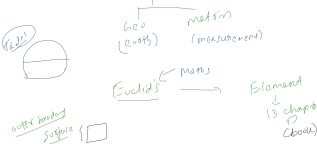


# Euclid's Geometry



which can't be proved  
 Axioms  
 Universal Truth  
 Postulates → axioms  
 Specifically for geometry

$$AB \approx BC \quad BC \approx CA$$

$$AB \approx CA$$

- Things which are equal to the same thing are equal to one another.
- If equals are added to equals, the wholes are equal.
- If equals are subtracted from equals, the remainders are equal.
- Things which coincide with one another are equal to one another.
- The whole is greater than the part.
- Things which are double of the same things are equal to one another.
- Things which are halves of the same things are equal to one another.

$$10 = 10$$

$$10 + 1 = 10 + 1$$

$$10 - 1 = 10 - 1$$

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$$10 \text{ Rs} = 10 \text{ Rs}$$

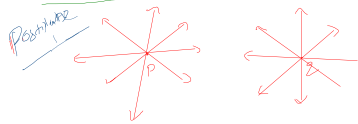
$$2 \times 10 = 2 \times 10$$

$$20 = 20$$

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

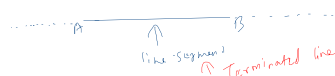
$$5 \text{ Rs} = 5 \text{ Rs}$$

## Euclid's Five postulates



P Q

## Postulate 2



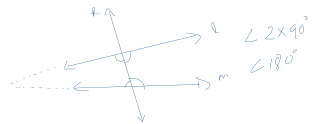
## Postulate 3



## 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 infinitely, meet on that side on which the sum of angles is less than two right angles.



A point is that which has no part

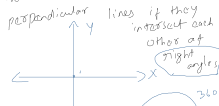


Something which occupies area.

(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 if they intersect each other at right angles.



is a part of a revolution makes angle 90° & angle 90° (that angle is called right angle)

(iii) Line segment - A straight path b/w two points A and B is called line segment AB.



(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 fixed point & any point on circle is called radius.

Square - Square is a rectangle with all sides equal.



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

## Some Undefined terms

Point is that which has no part



Plane - A plane is represented by a fine dust made by a sharp pencil on a sheet of paper. It is a flat, smooth surface.

Plane - Surface of a smooth wall or the surface of a paper etc. are close examples of plane.



Line - One side of a piece of paper, the crease in paper represent a geometrical line, the edge of a ruler etc.

(i) Parallel lines



(ii) Perpendicular lines

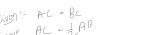


(iii) Point, line (iv) ray, as one situation is contradictory other situation that follow Axioms

(v) Line segment



(vi) Ray



Given: AC = BC  
 To prove: AC = 1/2 AB

Proof: According to Axiom 5, whole is greater than its part.  
 AB = AC + CB  
 AB = AC + AC (since AC = CB)  
 AB = 2AC  
 AC = 1/2 AB

Given: C is a midpoint of AB

To prove: AC = 1/2 AB

Proof: Let D is a midpoint of AB  
 AD = 1/2 AB  
 AC = 1/2 AB (given)

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.