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Class- 09th

Sub-.Maths

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1. Which of the following statements are true and which are false? Give reasons for your answers.

- (i) Only one line can pass through a single point.
- (ii) There are an infinite number of lines which pass through two distinct points.
- (iii) A terminated line can be produced indefinitely on both the sides.
- (iv) If two circles are equal, then their radii are equal.
- (v) In Fig. 5.9, if $AB = PQ$ and $PQ = XY$, then $AB = XY$.



Fig. 5.9

Solution:

(i) False

There can be infinite number of lines that can be drawn through a single point. Hence, the statement mentioned is False

(ii) False

Through two distinct points there can be only one line that can be drawn. Hence, the statement mentioned is False

(iii) True

A line that is terminated can be indefinitely produced on both sides as a line can be extended on both its sides infinitely. Hence, the statement mentioned is True.

(iv) True

The radii of two circles are equal when the two circles are equal. The circumference and the centre of both the circles coincide; and thus, the radius of the two circles should be equal. Hence, the statement mentioned is True.

(v) True

According to Euclid's 1st axiom- "Things which are equal to the same thing are also equal to one another". Hence, the statement mentioned is True.

2. 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

(ii) perpendicular lines

(iii) line segment

(iv) radius of a circle

(v) square

Solution:

Yes, there are other terms which need to be defined first, they are:

Plane: Flat surfaces in which geometric figures can be drawn are known as plane. A plane surface is a surface which lies evenly with the straight lines on itself.

Point: A dimensionless dot which is drawn on a plane surface is known as point. A point is that which has no part.

Line: A collection of points that has only length and no breadth is known as a line. And it can be extended on both directions. A line is breadth-less length.

(i) Parallel lines – Parallel lines are those lines which never intersect each other and are always at a constant distance perpendicular to each other. Parallel lines can be two or more lines.

(ii) Perpendicular lines – Perpendicular lines are those lines which intersect each other in a plane at right angles then the lines are said to be perpendicular to each other.

(iii) Line Segment – When a line cannot be extended any further because of its two end points then the line is known as a line segment. A line segment has 2 end points.

(iv) Radius of circle – A radius of a circle is the line from any point on the circumference of the circle to the center of the circle.

(v) Square – A quadrilateral in which all the four sides are said to be equal and each of its internal angle is right angles is called square.

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.

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

Do these postulates contain any undefined terms? Are these postulates consistent? Do they follow from Euclid's postulates? Explain.

Solution:

Yes, these postulates contain undefined terms. Undefined terms in the postulates are:

– There are many points that lie in a plane. But, in the postulates given here, the position of the point C is not given, as of whether it lies on the line segment joining AB or not.

– On top of that, there is no information about whether the points are in same plane or not.

And

Yes, these postulates are consistent when we deal with these two situations:

– Point C is lying on the line segment AB in between A and B.

– Point C does not lie on the line segment AB.

No, they don't follow from Euclid's postulates. They follow the axioms.