NCERT solutions for class 9 Maths Introduction to Euclid's Geometry Exercise 5.1

Q1. 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 infinite number of lines which pass through two distinct points.

(iii) A terminated line can be produced indefinitely on both the sides.

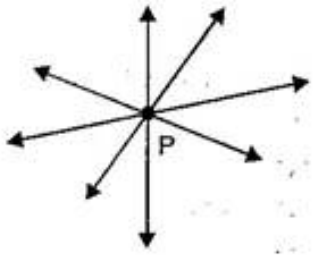
(iv) If two circles are equal, then their radii are equal.

(v) In Fig. 5.9, if AB = PQ and PQ = XY, then AB = XY

Ans: (i) False

Correct statement: Infinite many lines can pass through a single point.

This is self-evident and can be seen visually by the student given below:



(ii) False because the given statement contradicts the postulate I of the Euclid that assures that there is a unique line that passes through two distinct points.

Through two points P and Q a unique line can be drawn.

(iii) True

Reason:

We need to consider Euclid's Postulate 2: "A terminated line can be produced indefinitely."

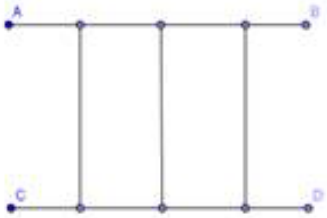
(iv) True

Reason:

Let us consider two circles with same radii.

We can conclude that, when we make the two circles overlap with each other, we will get a superimposed figure of the two circles.

Therefore, we can conclude that the radii of both



We need to define line first, in order to define parallel lines.

(ii) Perpendicular lines

Two lines are said to be perpendicular lines, when angle between these two lines is 90°.

We need to define line and angle, in order to define perpendicular lines.

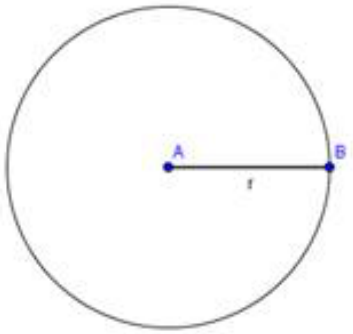
(iii) Line segment

A line of a fixed dimension between two given points is called as a line segment.

We need to define line and point, in order to define a line segment.

(iv) Radius of a circle

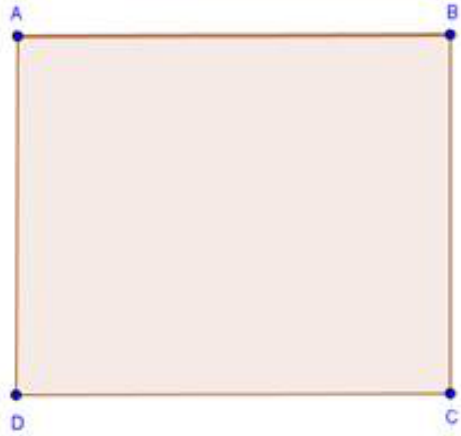
The distance of any point lying on the boundary of a circle from the center of the circle is called as radius of a circle.



We need to define circle and center of a circle, in order to define radius of a circle.

(v) Square

A quadrilateral with all four sides equal and all four angles of 90° is called as a square.



We need to define quadrilateral and angle, in order to define a square.

Q3. Consider the two 'postulates' given below:

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

(ii) There exists 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.

Ans: We are given with following two postulates

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

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

The undefined terms in the given postulates are point and line.

The two given postulates are consistent, as they do not refer to similar situations and they refer to two different situations.

We can also conclude that, it is impossible to derive at any conclusion or any statement that contradicts any well-known axiom and postulate.

The two given postulates do not follow from the postulates given by Euclid.

The two given postulates can be observed following from the axiom, "Given two distinct points, there is a unique line that passes through them".

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