1 | Basic Concepts in Geometry (Textbook pages 1 to 5)
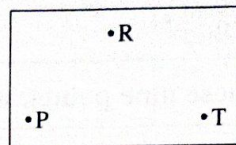
● **Read and Remember :**

● **Point :** A tiny dot (·) made by a finely pointed instrument on a sheet of paper, conveys the idea of a point. The dot (·) is the symbol for a point. Capital letters of the English alphabet are used to name points.

The points R, P and T are shown in the figure.

A point has a position but no magnitude.

● **Line segment :** If we join two distinct points A and B using a ruler, we get a line segment AB. Line segment AB is written as 'seg AB' or 'seg BA' in short. A line segment has a definite length.
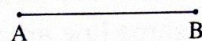
● **Line :** If we extend a line segment endlessly on both the sides, we get a line. In mathematics a line means a straight line.

The line *l* is shown in the figure. It is also named as line PQ or line QP, where P and Q are two points on the line *l*.
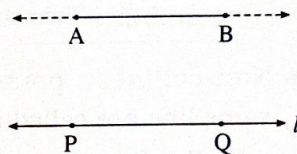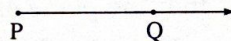
A line extends indefinitely on both the sides. To show this, we use arrow heads at both the ends of a line.

● **Ray :** A ray is a part of a line. A ray starts at one point and goes on indefinitely in one direction.

The starting point of the ray is called the origin (or end point).

In the figure, P is the origin of ray PQ.

> **Remember :** Ray PQ and ray QP are two different rays.

● **Try this. (Textbook page 2)**
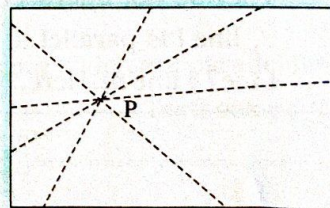
Take a point on the blackboard.

Let the students draw lines that pass through the point P.

How many such lines can be drawn?

An infinite number of lines can be drawn passing through one point.

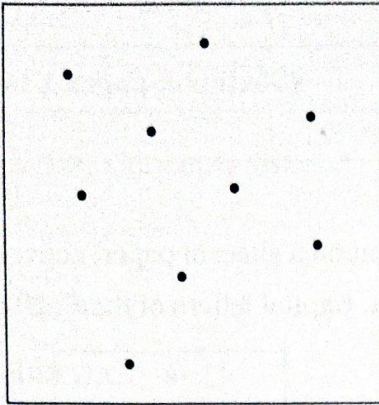Do the above activity in your notebook using your ruler to draw lines.

The lines are concurrent. P is the point of concurrence.

● **Concurrent lines :**

When three or more lines pass through the same point, they are called *concurrent lines.*

- **Can you tell?** (Textbook page 3)

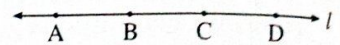There are nine points in the figure.

Name them.

If you choose any two points, how many lines can you draw?

[*One and only one line can be drawn passing through any two distinct points.*]

Of these nine points, which three or more points lie on a single line?

- **Collinear points :** Three or more points which lie on the same line are said to be *collinear points.*

    In the figure, points A, B, C and D lie on the same line *l*. These points are collinear points.

    Remember : Two distinct points are always collinear.

- **Non-collinear points :** Points which do not lie on the same line are called *non-collinear points.*
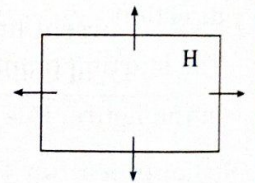
    In the figure, points A, B, C and D are non-collinear points.
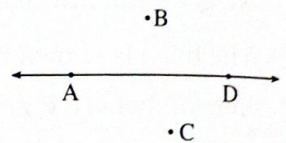
- **Plane :** A flat surface which extends infinitely in all directions is called a *plane.*

    In the figure, arrows are drawn on all the sides to show that the plane extends infinitely in all directions.

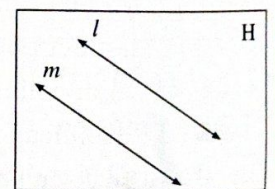   However, for the sake of convenience, arrows are omitted.

- **Parallel lines :** Lines which lie in the same plane but do not intersect each other are said to be parallel lines.

    In the figure, line *l* and line *m* lie in the plane H.

    They do not intersect each other.

    ∴ line *l* is parallel to line *m*.

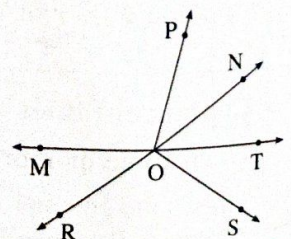   Line *l* ∥ line *m*. Here, '∥' is the symbol for parallel lines.

SUMMATIVE EVALUATION

PRACTICE SET 1 (Textbook pages 4 and 5)

1. Observe the figure and name the following :
    (1) **Collinear points :** Points M, O, T and points R, O, N.
    (2) **Rays :** Ray OM, ray OT, ray OP, ray ON, ray OS and ray OR.
    (3) **Line segments :** Seg MT, seg RN, seg OP, seg ON, seg OT, seg OS, seg OR and seg OM
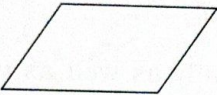   (4) **Lines :** Line MT and line RN.
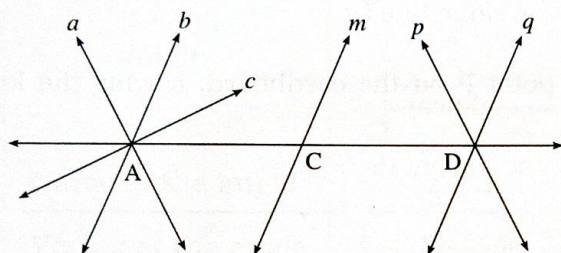
2. Write the different names of the line in the given figure :

Ans. Line l, line AB, line AC, line AD, line BC, line BD, line CD.

3. Match the following :

Group A	Group B	Ans.
(i)	(a) Ray	(i) ↔ (c)
(ii)	(b) Plane	(ii) ↔ (d)
(iii)	(c) Line	(iii) ↔ (b)
(iv)	(d) Line segment	(iv) ↔ (a)

4. Observe the figure given below. Name (i) parallel lines (ii) concurrent lines (iii) points of concurrence :

Ans.

(i) Parallel lines :

line $b \parallel$ line $m \parallel$ line q.

line $a \parallel$ line p.

(ii) Concurrent lines : line a, line b, line c and line AC; line p, line q and line AC.

(iii) Points of concurrence : Point A; point D.

Oral Test

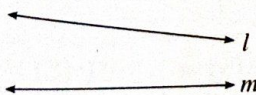1. How many lines can be drawn passing through

    (i) two distinct points

    (ii) three non-collinear points
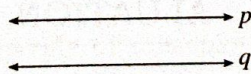
    (iii) three collinear points?

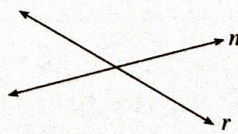2. Observe the given figures and say which are intersecting lines and which are parallel lines.
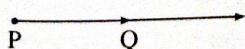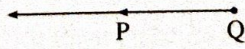
    (Textbook page 4)

(a)   (b)   (c)

3. Name the given figures :

(a)   (b)

4. In how many points do two lines intersect?

5. P is a point through which lines a, b and c pass. What is point P called?

1. Activities :

1. Take four points on a paper in such a way that three of which are collinear. Draw lines passing through the pairs of points. How many lines can you draw?

2. Take four points on a paper in such a way that no three of which are collinear. Draw lines passing through the pairs of points. How many lines can you draw?

3. Find and make a list of objects where you see parallel lines.

4. Take a plane paper. Put dots on it at equal distance horizontally as well as vertically. Draw the rangoli by drawing various lines.

5. Do the activity 'Maths, My Friend : On the ground, in the sky' given on textbook page 4.

2. Fun : (Textbook page 5)

Take a flat piece of cardboard, a needle and thread. Tie a big knot at one end of the thread. Thread the needle with the other end.

Pass the needle up through any convenient point P on the cardboard, leaving the knot below.

Pull the thread up.

Remove the needle and put it aside.

Hold the free end of the thread and gently pull it straight.

What shape do you see?

Holding the thread straight, turn it around point P in different directions.

See how a countless number of lines can pass through a single point P.

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