Fundamental Concepts

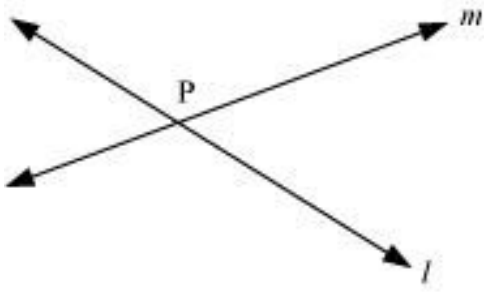
- A **point** determines a location. The tip of a compass, the sharpened end of a pencil, the pointed end of a needle, etc., are the examples of points. Generally, points are denoted by capital letters.
- A **line segment** corresponds to the shortest distance between two points. The line segment joining the points P and Q is denoted as $\overline{PQ}$.

- A **ray** is a portion of a line, which starts at one point and goes endlessly in a direction.

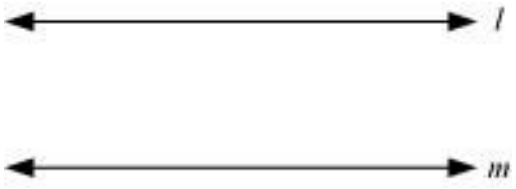
This ray is denoted as $\overrightarrow{PQ}$. Arrow head is towards Q since it is extended along Q.

- When a line segment PQ is extended indefinitely on both sides of points P and Q, it becomes a **line**, $\overleftrightarrow{PQ}$. Line is usually denoted by small letters *l, m, n.*

- Two lines *l* and *m* are said to be **intersecting lines**, if they intersect at a point.

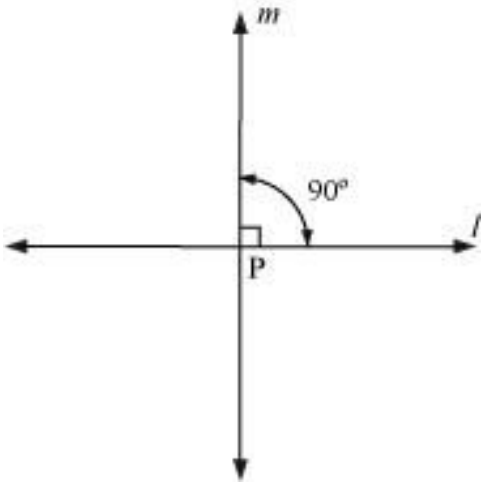


- Two lines are said to be **parallel lines**, if they never intersect each other. We can represent the given lines as $l \| m$.



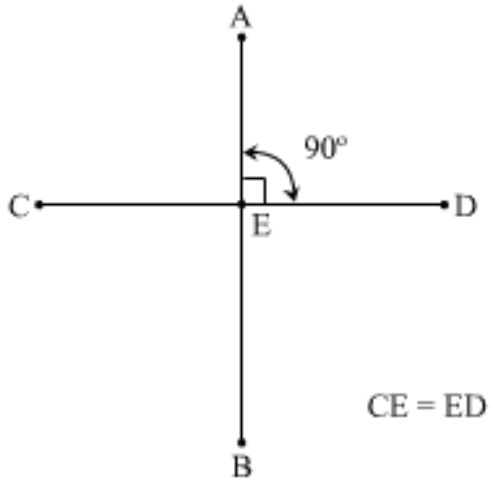
- A **plane** is a flat surface having length and width, but no thickness. We can say that a plane is a flat surface, which extends indefinitely in all directions. For example, surface of a wall, floor of a ground, etc.
- **Incidence properties in a plane:**
    1. An unlimited number ssing through a given point.
    2. There is exactly one li istinct points in a plane.
    3. Points lying on the same line are known as collinear points and the points which do not lie on the same line are called non-collinear points.
    4. Three or more lines passing through a common point are known as concurrent lines and that point is known as point of concurrence.

- Two lines are perpendicular, if the angle between them is 90°.



Here, lines *l* and *m* are perpendicular.

- A line segment AB is called the perpendicular bisector of line segment CD, if $\overline{AB}$ is perpendicular to $\overline{CD}$ and $\overline{AB}$ divides $\overline{CD}$ into two equal parts.



Here, line segment AB is the perpendicular bisector of line segment CD.

Curve:

Any drawing (straight or non-straight) done without lifting the pencil is called a **curve**. Line is also a curve.

The curve which does not intersect itself is called a **simple curve**.

2. A curve is said to be **closed**, if it has no starting or ending point.

3. A curve is said to be **open**, if its end points are not joined.