## **Introduction to Euclid's Geometry: Exercise 5.2**

## Q.1 How would you rewrite Euclid's fifth postulate so that it would be easier to understand?

*Sol.* The Euclid's fifth postulate state that 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 indefinitely, meet on that side on which the sum of angles is less than two right angles.



In given figure, the line PQ falls on lines AB and CD such that the sum of the interior angles 1 and 2 is less than 180° on the left side of PQ. Therefore, the lines AB and CD will eventually intersect on the left side of PQ.

## Q.2 Does Euclid's Fifth postulate imply the existence of parallel lines? Explain.

**Sol.** Yes, Euclid's Fifth postulate imply the existence of parallel lines. If a straight line  $\ell$  falls on two straight lines m and n such that the sum of the interior angles is two right angles, then from the Euclid's fifth postulate the lines will not meet on this side of  $\ell$ . Therefore, lines m and n are parallel.

