

# Mathematics

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(Chapter – 6) (Lines and Angles)(Exemplar Problems)

(Class – IX)

## Exercise 6.4

### Question 4:

Prove that through a given point, we can draw only one perpendicular to a given line.

[Hint: Use proof by contradiction]

### Answer 4:

Given:

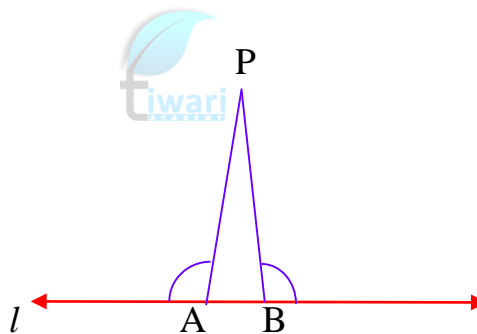
Consider a line  $l$  and a point  $P$ .

To prove:

Only one perpendicular can be drawn from  $P$  to  $l$ .

Construction:

Suppose the two lines  $PA$  and  $PB$  passing through the point  $P$  and which are perpendicular to  $l$ .



Proof:

In  $\triangle APB$ ,

$$\angle PAB + \angle P + \angle PBA = 180^\circ$$

[Angle sum property of a triangle]

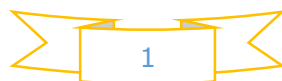
$$\Rightarrow 90^\circ + \angle P + 90^\circ = 180^\circ$$

$$\Rightarrow \angle P = 180^\circ - 180^\circ$$

$$\therefore \angle P = 0^\circ$$

Which is possible only when the lines  $PA$  and  $PB$  coincide.

Hence, only one perpendicular line can be drawn through a given point.



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