Exercise 6.3

Question 9:

A triangle ABC is right angled at A. L is a point on BC such that AL ⊥ BC. Prove that ∠BAL = ∠ACB.

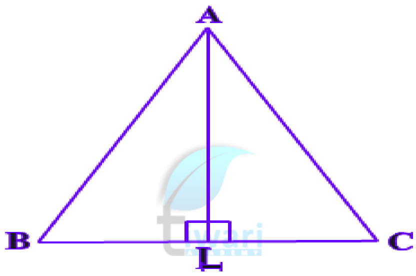
Answer 9:

Given:

In $\Delta ABC,\ \angle A = 90°$ and AL ⊥ BC

To prove:

∠BAL = ∠ACB.



Proof:

In ΔABC and ΔLAC

$\angle BAC = \angle ALC$ … (i) [each 90°]

and $\angle ABC = \angle ABL.$ … (ii) [common angle]

Adding equations (i) and (ii), we get

$$\angle BAC + \angle ABC = \angle ALC + \angle ABL \quad \dots (iii)$$

In ΔABC, $\angle BAC + \angle ACB + \angle ABC = 180°$ [sum of angles of triangle is 180°]

$\Rightarrow$ $\angle BAC + \angle ABC = 180° - \angle ACB$ … (iv)

In ΔABL, $\angle ABL + \angle ALB + \angle BAL = 180°$ [sum of angles of triangle is 180°]

$\Rightarrow \quad \angle ABL + \angle ALC = 180° - \angle BAL$ ... (v)

$[\angle ALC = ALB = 90°]$

Substituting the value from equation (iv) and (v) in equation (iii), we get

$$180° - \angle ACB = 180° - \angle BAL$$

$$\Rightarrow \quad \angle ACB = \angle BAL$$

Hence proved.