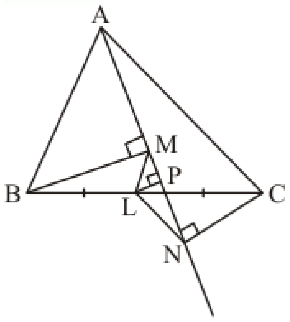
Quadrilaterals Ex 14.4 Q6

Answer :

In ΔABC, *BM* and *CN* are perpendiculars on any line passing through *A*.
Also.

$BL = LC$



We need to prove that $ML = NL$

From point *L* let us draw $LP \perp AN$

It is given that $BM \perp AN$, $LP \perp AN$ and $CN \perp AN$

Therefore,

$BM \parallel LP \parallel CN$

Since, L is the mid points of BC,

Therefore intercepts made by these parallel lines on MN will also be equal

Thus,

$MP = NP$

Now in ΔLMN,

$MP = NP$

And $LP \perp AN$. Thus, perpendicular bisects the opposite sides.

Therefore, ΔLMN is isosceles.

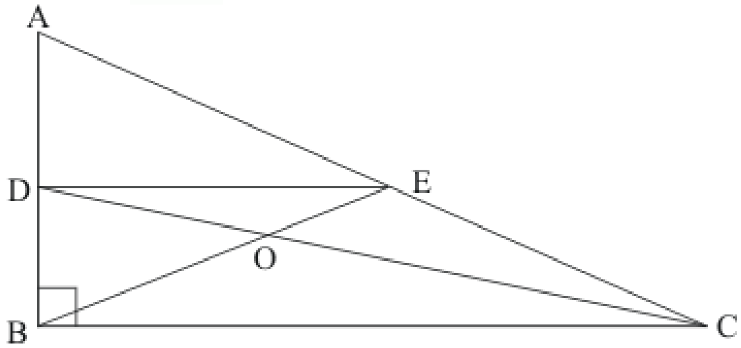
Hence $ML = NL$

Hence proved.

Quadrilaterals Ex 14.4 Q7

Answer :

We have ΔABC right angled at B.



It is given that $AB = 9\text{cm}$ and $AC = 15\text{cm}$

D and *E* are the mid-points of sides *AB* and *AC* respectively.

(i) We need to calculate length of *BC*.

In ΔABC right angled at B:

By Pythagoras theorem,

$$BC = \sqrt{AC^2 - AB^2}$$

$$BC = \sqrt{15^2 - 9^2}$$

$$BC = \sqrt{12^2}$$

$$BC = \boxed{12}$$

Hence the length of *BC* is $\boxed{12\text{cm}}$.

(ii) We need to calculate area of ΔADE.

In ΔABC right angled at *B*, *D* and *E* are the mid-points of *AB* and *AC* respectively.

Theorem states, the line segment joining the mid-points of any two sides of a triangle is parallel to the third side and equal to half of it.

Therefore, $DE \parallel BC$.

Thus, $\angle ADE = \angle ABC$ (Corresponding angles of parallel lines are equal)

And

$$DE = \frac{1}{2}BC$$

$$DE = \frac{1}{2}(12\text{cm})$$

$$DE = 6\text{cm}$$

area of $\Delta ADE = \frac{1}{2}(AD)(DE)$

D is the mid-point of side *AB*.

Therefore, area of $\Delta ADE = \frac{1}{2}\left(\frac{AB}{2}\right)(DE)$

$$= \frac{1}{2}\left(\frac{9}{2}\right)(6)$$

$$= \frac{27}{2}$$

$$= \boxed{13.5}$$

Hence the area of ΔADE is $\boxed{13.5\text{cm}^2}$.

*********** END **********