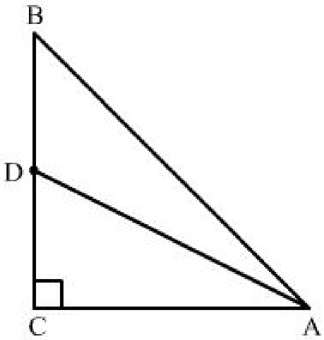
Triangles Ex 4.7 Q22

Answer :

It is given that ΔABC is a right-angled at C and D is the mid-point of BC.



In the right angled triangle ADC, we will use Pythagoras theorem,

$AD^2 = DC^2 + AC^2$ ....(1)

Since D is the midpoint of BC, we have

$$DC = \frac{BC}{2}$$

Substituting $DC = \frac{BC}{2}$ in equation (1), we get

$$AD^2 = \left(\frac{BC}{2}\right)^2 + AC^2$$

$$AD^2 = \frac{BC^2}{4} + AC^2$$

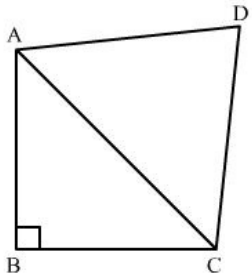
$$4AD^2 = BC^2 + 4AC^2$$

$$BC^2 = 4AD^2 - 4AC^2$$

$$BC^2 = 4\left(AD^2 - AC^2\right)$$

Triangles Ex 4.7 Q23

Answer :



In order to prove angle $\angle ACD = 90°$ it is enough to prove that $AD^2 = AC^2 + CD^2$.

Given, $AD^2 = AB^2 + BC^2 + CD^2$

$AD^2 - CD^2 = AB^2 + BC^2$ .....(1)

Since $\angle B = 90°$, so applying Pythagoras theorem in the right angled triangle ABC, we get

$AC^2 = AB^2 + BC^2$ .....(2)

From (1) and (2), we get

$AC^2 = AD^2 - CD^2$

$AC^2 + CD^2 = AD^2$

Therefore, angle $\boxed{\angle ACD = 90°}$. (Converse of pythagoras theorem)

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