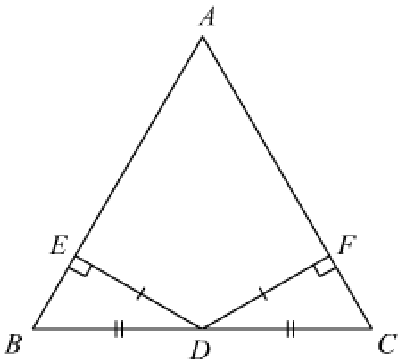
Congruent Triangles Ex 10.5 Q1

Answer :

We have to prove that ΔABC is isosceles.



Let DE and DF be perpendicular from D on AB and AC respectively.

In order to prove that $AB = AC$

We will prove that $\Delta BDE \cong \Delta CDF$

Now in ΔBDE and ΔCDF we have

$\angle BED = \angle CFD = 90^0$

$BD = CD$ (Since D is mid point of BC)

$DE = DF$ (Given)

So by RHS congruence criterion we have

$\Delta BDE \cong \Delta CDF$

$\Rightarrow \angle B = \angle C$

And $AC = AB$

Hence ΔABC is isosceles.

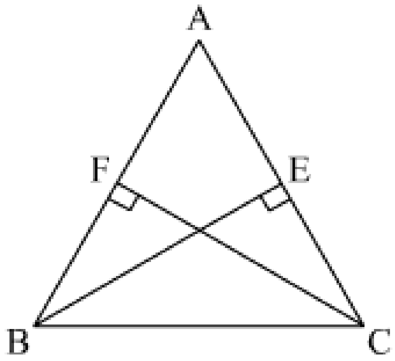
Congruent Triangles Ex 10.5 Q2

Answer :

It is given that

$BE \perp AC$, and $CF \perp AB$

And $BE = CF$.



We have to prove ΔABC is isosceles.

To prove ΔABC is isosceles we will prove $\angle B = \angle C$

For this we have to prove $\Delta BFC \cong \Delta CEB$

Now comparing ΔBFC and ΔCEB we have

$BE = CF$ (Given)

$BC = BC$ (Common side)

So, by right hand side congruence criterion we have

$$\Delta BFC \cong \Delta CEB$$
$$\Rightarrow \angle FBC = \angle ECB$$
$$\Rightarrow \angle ABC = \angle ACB$$

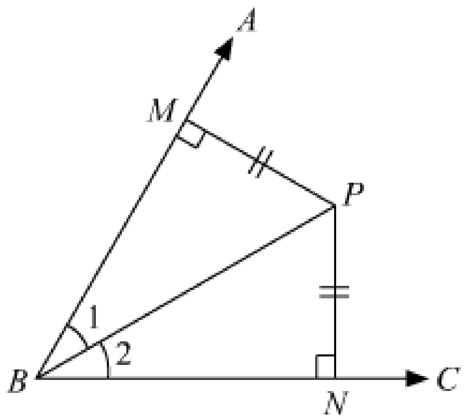
So $AB = AC$ (since sides opposite to equal angle are equal)

Hence ΔABC is isosceles.

Congruent Triangles Ex 10.5 Q3

Answer :

Let P be a point within $\angle ABC$ such that $PM = PN$



We have to prove that P lies on the bisector of $\angle ABC$

In ΔPMB and ΔPNB we have

$PM = PN$ (We have)

$BP = BP$ (Common)

$\angle BMP = \angle BNP = 90^0$

So by right hand side congruence criterion, we have

$\Delta PBM \cong \Delta PBN$

So, $\angle 1 = \angle 2$

Hence P lies on the bisector of $\angle ABC$ proved.

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