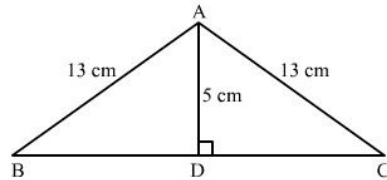




Triangles Ex 4.7 Q12

Answer :



We have given an isosceles triangle and we know that the altitude drawn on the unequal side of the isosceles triangle bisects that side.

Therefore, in  $\triangle ADB$  and  $\triangle ADC$

$\angle B = \angle C$  (Equal sides have equal angles opposite to them)

$AD = AD$

$\angle ADB = \angle ADC$   $90^\circ$  each

$\triangle ADB \cong \triangle ADC$  (AAS congruence theorem)

$\therefore BD = DC$

Now we will use Pythagoras theorem in right angled triangle ADB.

$$AB^2 = AD^2 + BD^2$$

Let us substitute the values of AB and AD we get,  $13^2 = 5^2 + BD^2$

$$169 = 25 + BD^2$$

Subtracting 25 from both sides we get,

$$BD^2 = 169 - 25$$

$$BD^2 = 144$$

$$\therefore BD = 12$$

Since  $BC = 2BD$

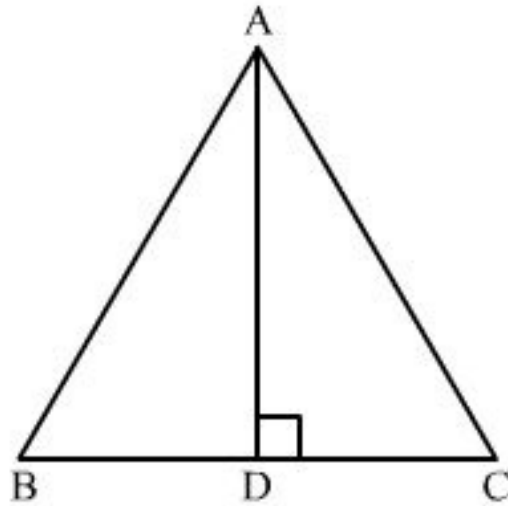
$$\therefore BC = 2 \times 12$$

$$= 24$$

Therefore, length of BC is 24 cm .

Triangles Ex 4.7 Q13

**Answer :**



In  $\triangle ADB$  and  $\triangle ADC$

$$\angle B = \angle C \quad (60^\circ \text{ each})$$

$$AD = AD$$

$$\angle ADB = \angle ADC \quad (90^\circ \text{ each})$$

$$\triangle ADB \cong \triangle ADC \quad (\text{AAS congruence theorem})$$

$$\therefore BD = DC$$

$$\therefore BC = 2BD$$

But  $BC = 2a$  therefore, we get,

$$2a = 2BD \quad \dots\dots\dots (1)$$

Now we will divide both sides of the equation (1) by 2, we get,

$$\therefore BD = a$$

Now we will use Pythagoras theorem in right angled triangle ADB.

$$AB^2 = AD^2 + BD^2$$

Now we will substitute the values of AB and BD we get,

$$(2a)^2 = AD^2 + a^2$$

$$4a^2 = AD^2 + a^2$$

$$3a^2 = AD^2$$

$$\therefore AD = \sqrt{3}a$$

$$\text{Therefore, } AD = \boxed{\sqrt{3}a}.$$

We have given an equilateral triangle and we know that the area of the equilateral triangle is

$$\frac{\sqrt{3}}{4} \times \text{side}^2.$$

Here, side is  $2a$

$$\therefore A(\triangle ABC) = \frac{\sqrt{3}}{4} \times (2a)^2$$

$$\therefore A(\triangle ABC) = \frac{\sqrt{3}}{4} \times 4a^2$$

$$A(\triangle ABC) = \sqrt{3}a^2$$

$$\text{Therefore, } A(\triangle ABC) = \boxed{\sqrt{3}a^2}.$$

\*\*\*\*\* END \*\*\*\*\*