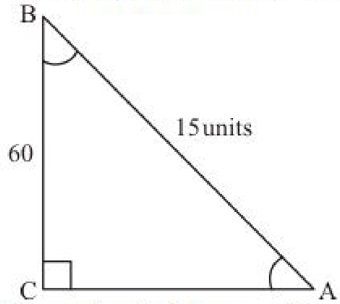
Trigonometric Ratios Ex 5.2 Q30

Answer :

We are given the following triangle with related information



It is required to find $\angle A$, $\angle C$ and length of sides *AC* and *BC*

ΔABC is right angled at *C*

Therefore,

$\angle C = 90^\circ$

Now we know that sum of all the angles of any triangle is 180°

Therefore,

$\angle A + \angle B + \angle C = 180^\circ$ …… (1)

Now by substituting the values of known angles $\angle B$ and $\angle C$ in equation (1)

We get,

$\angle A + 60^\circ + 90^\circ = 180^\circ$

Therefore,

$\angle A + 150^\circ = 180^\circ$

$\Rightarrow \quad \angle A = 180^\circ - 150^\circ$

$\Rightarrow \quad \angle A = 30^\circ$

Therefore,

$\angle A = 30^\circ$

Now,

We know that,

$$\cos B = \cos 60^\circ$$

$$\Rightarrow \quad \frac{BC}{AB} = \cos 60^\circ \qquad \ldots\ldots(2)$$

Now we have,

AB=15 units and $\cos 60^\circ = \frac{1}{2}$

Therefore by substituting above values in equation (2)

We get,

$$\cos B = \cos 60^\circ$$

$$\Rightarrow \quad \frac{BC}{AB} = \cos 60^\circ$$

$$\Rightarrow \quad \frac{BC}{15} = \frac{1}{2}$$

Now by cross multiplying we get,

$$\frac{BC}{15} = \frac{1}{2}$$

$$\Rightarrow 2 \times BC = 15 \times 1$$

$$\Rightarrow \quad BC = \frac{15}{2}$$

$$\Rightarrow \quad BC = 7.5$$

Therefore,

$\boxed{BC = 7.5 \text{ units}}$ ...... (3)

Now,

We know that,

$$\sin B = \sin 60°$$

$$\Rightarrow \frac{AC}{AB} = \sin 60° \qquad \ldots\ldots(4)$$

Now we have,

AB=15 units and $\sin 60^{\circ} = \frac{\sqrt{3}}{2}$

Therefore by substituting above values in equation (4)

We get,

$$\sin B = \sin 60°$$

$$\Rightarrow \frac{AC}{AB} = \sin 60°$$

$$\Rightarrow \frac{AC}{15} = \frac{\sqrt{3}}{2}$$

Now by cross multiplying we get,

$$\frac{AC}{15} = \frac{\sqrt{3}}{2}$$

$$\Rightarrow 2 \times AC = \sqrt{3} \times 15$$

$$\Rightarrow \quad AC = \frac{\sqrt{3} \times 15}{2}$$

$$\Rightarrow \quad AC = \frac{15}{2}\sqrt{3}$$

Therefore,

$$AC = \frac{15}{2}\sqrt{3} \text{ units}$$

Hence,

$$\angle A = 30^\circ$$

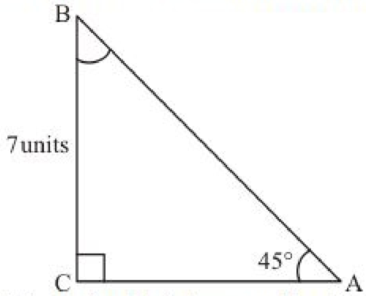
$$\boxed{BC = 7.5 \text{ units}}$$

$$AC = \frac{15}{2}\sqrt{3} \text{ units}$$

Trigonometric Ratios Ex 5.2 Q31

Answer :

We are given the following information in the form of the triangle



It is required to find $\angle B$ and length of sides *AB* and *AC*

In $\Delta ABC\ \angle C = 90°$

Now we know that sum of all the angles of any triangle is 180°

Therefore,

$\angle A + \angle B + \angle C = 180°$ …… (1)

Now by substituting the values of known angles $\angle A$ and $\angle C$ in equation (1)

We get,

$45° + \angle B + 90° = 180°$

Therefore,

$\angle B + 135° = 180°$

$\Rightarrow \quad \angle B = 180° - 135°$

$\Rightarrow \quad \angle B = 45°$

Therefore,

$\angle B = 45°$ …… (2)

Now,

We know that,

$\cos B = \cos 45°$

$\Rightarrow \frac{BC}{AB} = \cos 45°$ $\quad$ ……(3)

Now we have,

BC = 7 units and $\cos 45° = \frac{1}{\sqrt{2}}$

Therefore by substituting above values in equation (3)

We get,

$\cos B = \cos 45°$

$\Rightarrow \frac{7}{AB} = \cos 45°$

$\Rightarrow \frac{7}{AB} = \frac{1}{\sqrt{2}}$

Now by cross multiplying we get,

$7\sqrt{2} = AB$

$\Rightarrow AB = 7\sqrt{2}$

Therefore,

$AB = 7\sqrt{2}$ units …… (4)

Now,

We know that,

$$\sin B = \sin 45°$$

$$\Rightarrow \frac{AC}{AB} = \sin 45° \quad ......(5)$$

Now we have,

$AB = 7\sqrt{2}$ units and $\sin 45° = \frac{1}{\sqrt{2}}$

Therefore by substituting above values in equation (5)

We get,

$$\frac{AC}{7\sqrt{2}} = \sin 45°$$

$$\Rightarrow \frac{AC}{7\sqrt{2}} = \frac{1}{\sqrt{2}}$$

Now by cross multiplying we get,

$$AC = \frac{7\sqrt{2}}{\sqrt{2}}$$

$$\Rightarrow AC = 7$$

Therefore,

$$\boxed{AC = 7 \text{ units}} \quad ...... (6)$$

Therefore,

From equation (2), (4) and (6)

$$\boxed{\angle B = 45°}, \boxed{AB = 7\sqrt{2} \text{ units}}, \boxed{AC = 7 \text{ units}}$$

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