



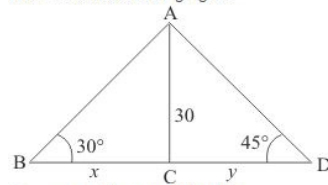
Some Applications of Trigonometry Ex 12.1 Q31

Answer :

Let BD be the width of river. And the angle of depression of the bank on opposite side of the river are 30° and 45° respectively. It is given that $AC = 30$ m. Let $BC = x$ and $CD = y$. And $\angle ABC = 30^\circ$, $\angle ADC = 45^\circ$.

Here we have to find the width of river.

We have the following figure



So we use trigonometric ratios.

In a triangle ABC ,

$$\Rightarrow \tan 30^\circ = \frac{AC}{BC}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{30}{x}$$

$$\Rightarrow x = 30\sqrt{3}$$

Again in a triangle ADC ,

$$\Rightarrow \tan 45^\circ = \frac{AC}{CD}$$

$$\Rightarrow 1 = \frac{30}{y}$$

$$\Rightarrow y = 30$$

So width of river is:

$$x + y = 30\sqrt{3} + 30$$

$$x + y = 30(\sqrt{3} + 1)$$

Hence the width of river is $30(\sqrt{3} + 1)$ m.

Some Applications of Trigonometry Ex 12.1 Q32

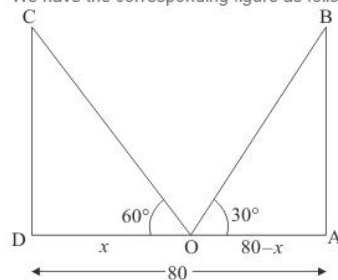
Answer :

Let AB and CD be the two poles of equal height h m. O be the points makes an angle of elevation from the top of poles are 60° and 30° respectively.

Let $OA = 80 - x$, $OD = x$. And $\angle BOA = 30^\circ$, $\angle COD = 60^\circ$.

Here we have find height of poles and distance of the points from poles.

We have the corresponding figure as follows.



So we use trigonometric ratios.

In a triangle COD ,

$$\Rightarrow \tan 60^\circ = \frac{CD}{DO}$$

$$\Rightarrow \sqrt{3} = \frac{h}{x}$$

$$\Rightarrow x = \frac{h}{\sqrt{3}}$$

Again in a triangle AOB ,

$$\Rightarrow \tan 30^\circ = \frac{AB}{OA}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{h}{80 - x}$$

$$\Rightarrow \sqrt{3}h = 80 - x$$

$$\Rightarrow \sqrt{3}h = 80 - \frac{h}{\sqrt{3}}$$

$$\Rightarrow \sqrt{3}h + \frac{h}{\sqrt{3}} = 80$$

$$\Rightarrow 3h + h = 80\sqrt{3}$$

$$\Rightarrow 4h = 80\sqrt{3}$$

$$\Rightarrow h = 20\sqrt{3}$$

$$\Rightarrow x = \frac{20\sqrt{3}}{\sqrt{3}}$$

$$\Rightarrow x = 20$$

And

$$\Rightarrow OA = 80 - x$$

$$\Rightarrow = 80 - 20$$

$$\Rightarrow = 60$$

Hence the height of pole is $20\sqrt{3}$ m. and distances are 20 m, 60 m respectively.

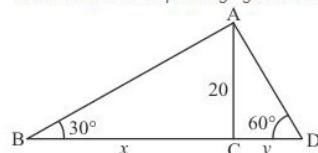
Some Applications of Trigonometry Ex 12.1 Q33

Answer :

Let BD be the width of river. And the angles of depression on either side of the river are 30° and 60° respectively. It is given that $AC = 20$ m. Let $BC = x$ and $CD = y$. And $\angle ABC = 30^\circ$, $\angle ADC = 60^\circ$

Here we have to find the width of river.

We have the corresponding figure as follows



So we use trigonometric ratios.

In a triangle ABC ,

$$\Rightarrow \tan B = \frac{AC}{BC}$$

$$\Rightarrow \tan 30^\circ = \frac{20}{x}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{20}{x}$$

$$\Rightarrow x = 20\sqrt{3}$$

Again in a triangle ADC

$$\Rightarrow \tan D = \frac{AC}{CD}$$

$$\Rightarrow \tan 60^\circ = \frac{20}{y}$$

$$\Rightarrow \sqrt{3} = \frac{20}{y}$$

$$\Rightarrow y = \frac{20}{\sqrt{3}}$$

$$\Rightarrow x + y = 20\sqrt{3} + \frac{20}{20\sqrt{3}}$$

$$\Rightarrow x + y = \frac{80}{\sqrt{3}}$$

Hence width of river is $\boxed{\frac{80}{\sqrt{3}}}$ m.

***** END *****