

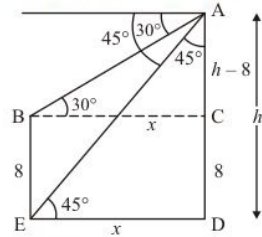


Some Applications of Trigonometry Ex 12.1 Q25

Answer :

Let AD be the multistoried building of height h m. And angle of depression of the top and bottom are 30° and 45° . We assume that $BE = 8$, $CD = 8$ and $BC = x$, $ED = x$ and $AC = h - 8$. Here we have to find height and distance of building.

We use trigonometrical ratio.



In $\triangle AED$,

$$\Rightarrow \tan E = \frac{AD}{DE}$$

$$\Rightarrow \tan 45^\circ = \frac{AD}{DE}$$

$$\Rightarrow 1 = \frac{h}{x}$$

$$\Rightarrow x = h$$

Again in $\triangle ABC$,

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

$$\Rightarrow \tan 30^\circ = \frac{h-8}{x}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{h-8}{x}$$

$$\Rightarrow h\sqrt{3} - 8\sqrt{3} = x$$

$$\Rightarrow h\sqrt{3} - 8\sqrt{3} = h$$

$$\Rightarrow h(\sqrt{3} - 1) = 8\sqrt{3}$$

$$\Rightarrow h = \frac{8\sqrt{3}}{\sqrt{3}-1} \times \frac{\sqrt{3}+1}{\sqrt{3}+1}$$

$$\Rightarrow h = \frac{24+8\sqrt{3}}{2}$$

$$\Rightarrow h = 4(3+\sqrt{3})$$

And

$$\Rightarrow x = 4(3+\sqrt{3})$$

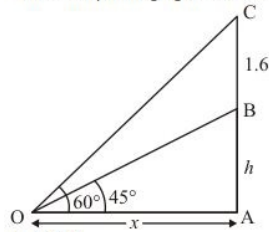
Hence the required height is $4(3+\sqrt{3})$ meter and distance is $4(3+\sqrt{3})$ meter.

Some Applications of Trigonometry Ex 12.1 Q26

Answer :

Let AB be the pedestal of height h m and BC the statue of height 1.6 meter and angle of elevation at top of statue is 60° and angle of elevation of pedestal at the same point is 45° . Here we have to find height of pedestal.

The corresponding figure is here



In $\triangle OAB$

$$\Rightarrow \tan 45^\circ = \frac{AB}{OA}$$

$$\Rightarrow 1 = \frac{h}{x}$$

$$\Rightarrow x = h$$

Again in $\triangle OAC$

$$\Rightarrow \tan 60^\circ = \frac{AC}{OA}$$

$$\Rightarrow \sqrt{3} = \frac{h+1.6}{x}$$

$$\Rightarrow \sqrt{3}x = h+1.6$$

$$\Rightarrow h\sqrt{3} = h+1.6$$

$$\Rightarrow h = \frac{1.6}{\sqrt{3}-1}$$

$$\Rightarrow h = 0.8(\sqrt{3}+1)$$

Hence the height of pedestal is $\boxed{0.8(\sqrt{3}+1)}$.

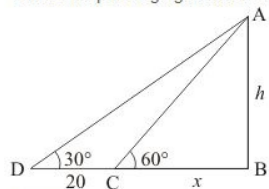
Some Applications of Trigonometry Ex 12.1 Q27

Answer :

Let AB be the T.V tower of height h m on a bank of river and D be the point on the opposite of the river. An angle of elevation at top of tower is 60° and from a point 20m away then angle of elevation of tower at the same point is 30° . Let $AB = h$ and $BC = x$.

Here we have to find height and width of river.

The corresponding figure is here



In $\triangle CAB$

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

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

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

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

Again in $\triangle DBA$

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

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

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

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

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

$$\Rightarrow \frac{2h}{\sqrt{3}} = 20$$

$$\Rightarrow h = 10\sqrt{3}$$

$$\Rightarrow x = \frac{10\sqrt{3}}{\sqrt{3}}$$

$$\Rightarrow x = 10$$

Hence the height of the tower is $10\sqrt{3}$ m and width of river is 10 m.

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